ANALYSIS OF FUNCTIONAL OUTCOME OF SURGICAL RELEASE FOR DEQUERVAIN'S DISEASE

DISSERTATION SUBMITTED FOR

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CHENNAI, TAMILNADU

CERTIFICATE

This is to certify that this dissertation entitled "**ANALYSIS OF FUNCTIONAL OUTCOME OF SURGICAL RELEASE FOR DEQUERVAIN'S DISEASE**" is the bonafide work done by Dr. M.SIVAKUMAR., under my supervision in the Department of Orthopaedic Surgery, Madurai Medical College, Madurai-20.

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Last but not the least, I express my gratitude to the patients for their kind co-operation.

DECLARATION

I, **Dr. SIVAKUMAR .M.**, solemnly declare that the dissertation titled "**ANALYSIS OF FUNCTIONAL OUTCOME OF SURGICAL RELEASE FOR DEQUERVAIN'S DISEASE",** has been prepared by me. This is submitted to **"The Tamil Nadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of M S degree branch II Orthopaedics.

Place:Madurai **Dr.M. SIVAKUMAR**

Date :

ABSTRACT

Background: Several operative methods have been described for de Quervain's disease, but nodefinite consensus has emerged in the literature. Sometimes simple release of the extensorretinaculum can cause incomplete relief, whereas re-adhesion and excessive excision of theextensor retinaculum can cause volar subluxation of the abductor pollicislongus and extensorpollicisbrevis tendons. In this prospective study, we evaluated the early results of operativetreatment with release of tendon sheath of abductor pollicislongus and extensor pollicisbrevis along with partial resection of the extensor retinaculum when conservative methods have failed. With Positive Finkelstin's test and Ultrasonographical thickening.

*Hypothesis:*We hypothesized that partial removal of the extensor retinaculum may be used asan alternative to solve problems such as incomplete release or re-adhesion and volar subluxationof the tendons.

.

Patients and methods:Our study includes 20 resistant cases of de quervains disease. open surgical release of tendon sheath of abductor pollicislongus and extensor pollicisbrevis along with excision of thin strip of dorsally based extensor retinaculam. Mean age group in all operated cases 28- 45 years among 20 patients 19 were females 1 is male. Involvement of right wrist is 13 and left wrist is 7. Dominant extremity is commonly involved. Dequervains disease is caused by repetitive forearm wrist activities in our study group housewifes are 75% patients overall. Average time for conservative management is 6 months.

Open surgical release of extensor tendon sheaths of extensor pollicisbrevis and abductor pollicislongus. The mean pre operative DASH score is 78.25 where as mean post operative DASH score is 8.03 which is statistically significant. The mean pre operative VAS score is 8.65 where aspost operative VAS score is 0.35 which is statistically significant. The successful treatment of dequervains disease is defined as more than a 25% reduction in disabilities of arm shoulder hand (DASH) and visual analog scale without a105reintervention after 1 year. Pain relief was achieved in all 20 patient. 2 cases had transient numbness of thumb .

Release of abductor pollicislongus and extensor pollicisbrevis tendon sheath alongwith thin strip of dorsally based flap of retinaculam removal will improve the functional outcome.

1. DeQuervain's Disease, although frequently unrecognized, is a crippling condition which is easily remedied by surgery.

2.. The condition is far more prone to occur in women, and this pathologic condition should be considered in the differential diagnosis of persistent pain at the base of the thumb in the region of the radial styloid.

3. Surgery is the only treatment for this condition, and should be carried out as soon as possible. In our study group follow up is short term. Long term follow up is necessary before conclude the outcome.

KEY WORDS

Dequervain's disease, Finkelstin's test, Abductor pollicislongus, extensor pollicisbrevis.

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I. DASH Score

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INTRODUCTION

DEQUERVAIN'S DISEASE is described as stenosing tenosynovitis / Tendovaginitis of the Abductor pollicis longus and extensor pollicis brevis of the first Extensor compartment of the wrist.

It was first described by a Swiss surgeon, Fritz de Quervain a Kocher's Clinic in Berne, Switzerland, in 1895[1]. He described this condition in 5 cases of which all are Female Patients. In recent days, the condition was found to represent thickening of Tendon sheath rather than tendinitis owing to lack of histopathological evidence of any inflammation in specimens.

Individuals occupied with skilled work involving wrist in ulnar deviation with abducted and extended thumb and females with household work are mainly affected by this condition. The

disability caused by this condition is highly debilitating leading to restriction of daily activities.

[2]Bunnell comments, "A hand without a thumb is no more than a hook." In a classical case of de Quervain disease functional limitations so much as rendering thumb functionless.

Though there are various modalities of conservative and minimally invasive management as physiotherapy, splinting and corticosteroid injections they do not address the pathology of this condition.

The fibrosis of involved tendon sheath may be progressive or stationary. By means of conservative management the fibrotic process never regress or resolve. But continued motion of the Tendons within stenosed sheath further aggravates this condition by Progressive proliferation of fibrous tissue and scarring.

Thus surgical release of the tendons from the Sheath is the only way of correcting the underlying pathology and prevent the progression, relieving the patients from the symptoms.

Most of the cases that are treated by surgical management have undergone one or the other mode of conservative managementas physiotherapy, splinting, or plaster cast. The utility of such therapy usually goes unrecognized for a long period of time, until either the patient demands a change in treatment or the condition is recognized in surgical consultation

AIM

ANALYSIS OF FUNCTIONAL OUTCOME OF SURGICAL RELEASE FOR DEQUERVAIN'S DISEASE

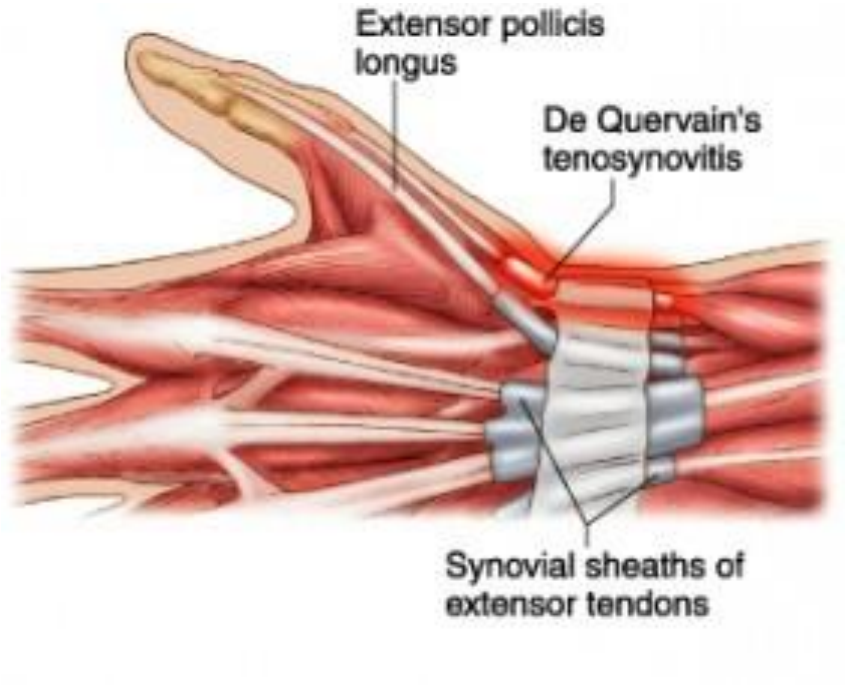
REVIEW OF LITERATURE

EPIDEMIOLOGY :

Dequervain’s tenosynovitis was first described by a Swiss surgeon, Fritz de Quervain a Kocher's Clinic in Berne, Switzerland, in 1895. He described this condition in 5 cases of which all are Female Patients. In recent days, the condition was found to represent thickening of Tendon sheath rather than tendinitis owing to lack of histopathological evidence of any inflammation in specimens.

Tenosynovitis means inflammation of the synovial sheath that contains tendons. It may be localised or diffue. Diffuse which occurs from rheaumatoid arthritis and other inflammatory arthritis. And also this process involves thickening of the extensor retinaculam. Tenosynovitis is otherwise known as tenovaginitis. other proliferative disorders which cause diffue tenosynovitis are amyloidosis, crystalline tendinopathy (calcific tenosynovitis) and septic tenosynovitis including bacterial, mycobacterial and fungal. These tenosynovitis gradually produces micro trauma over the tendons finally causes tendon rupture.

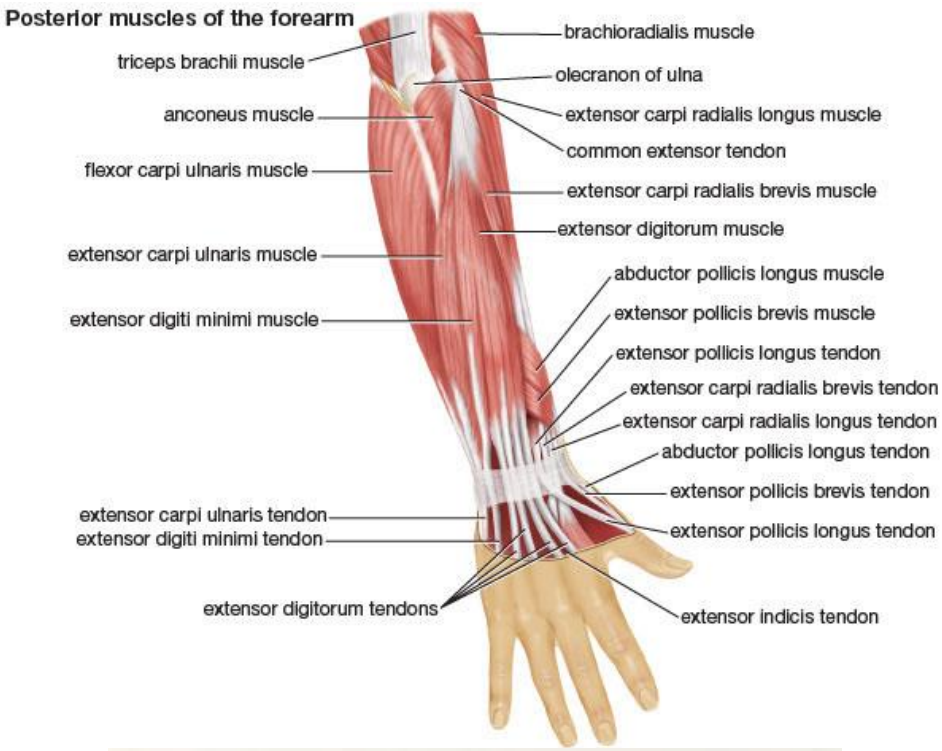
[3]Based on many studies dequervain’s disease is more common in women aged between 20 to 45 years.it occurs more frequently in non athletes than athletes.it is a work related disease commonly seen in occupants with repetitive forearm and wrist movements, household activities[4], computer keyboard activities, plumbing, meat cutting, textile production, mechanics.

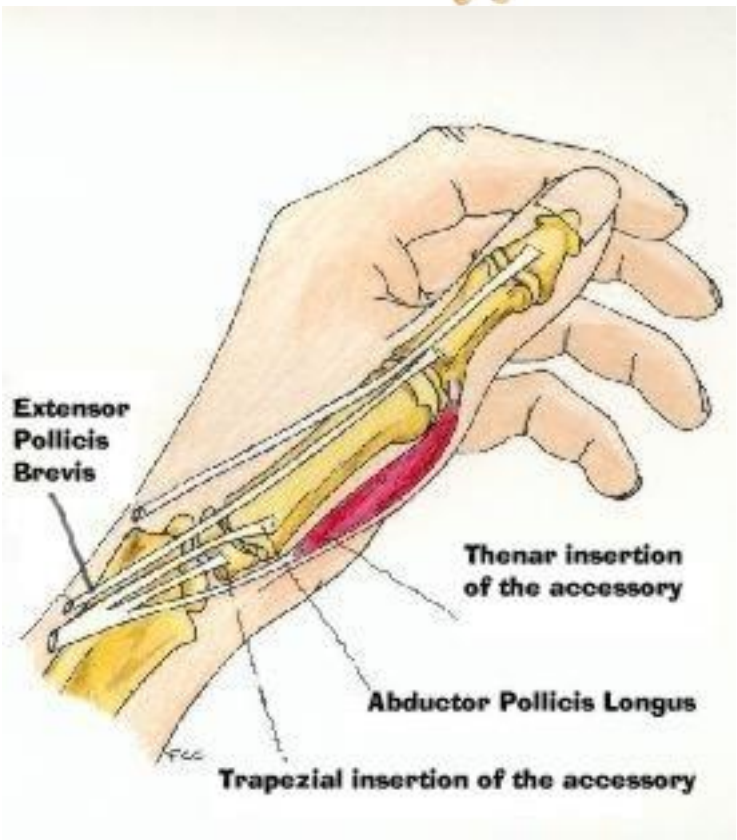


De Quervain syndrome also known as

- BlackBerry thumb,
- gamer's thumb,
- washerwoman's sprain,
- radial styloid tenosynovitis,
- de Quervain disease,
- de Quervain's tenosynovitis,
- de Quervain's stenosing tenosynovitis,
- mother's wrist, or mommy thumb is a tenosynovitis of the sheath or tunnel that surrounds two tendons that control movement of the thumb.

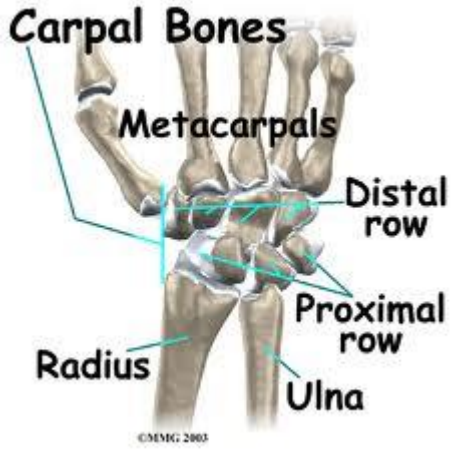
ANATOMICAL CONSIDERATIONS





Knowledge of Soft tissue Anatomy of Dorsal compartment of wrist joint and bony structures around is essential for the vital safe surgical technique.

BONY ANATOMY:



This picture shows bony relationship between lower end of radius, carpal bones and metacarpal bones.

SOFT TISSUE ANATOMY

[5]The dorsum of the wrist comprises 6 compartments comprising the extensor tendons. Among which 5 are fibroosseous and 1 is fibrous.

1st compartment includes:

Abductor pollicis Longus

Extensor Pollicis Brevis

2nd Compartment :

Extensor Carpi Radialis Longus

Extensor Carpi Radialis Brevis

3rd Compartment:

Extensor Pollicis Longus

4th Compartment:

Extensor Digitorum Communis

Extensor Indicis

Anterior Interroseous Artery

Posterior Interroseous Nerve

5th Compartment: Fibrous

Extensor Digiti Minimi

6th Compartment:

Extensor Carpi Ulnaris

The roofs of these compartments are composed of a deep layer of longitudinal Fibers of Extensor Retinaculum which is a modification of Deep fascia of forearm and is strengthened by a superficial layer of transverse fibers from the dorsal carpal ligament. And the Floor Mainly formed by Radius and Ulna Except for 5th compartment which is floored by Interosseous membrane.

1st Compartment:

This compartment averages about two and one-half inches in length formed by ligamentous synovial-lined sheath in a shallow groove on the styloid process of radius.

It comprises,

Abductor Pollicis Longus:

Origin : Dorsal Aspect of Diaphysis of Radius, Ulna &

Interosseous Membrane

Insertion: Dorsal Surface of 1st Metacarpal Base

Action: Thumb - Abduction, Lateral Rotation & Extension

Wrist - Abduction

Nerve supply - Radial Nerve C6,C7

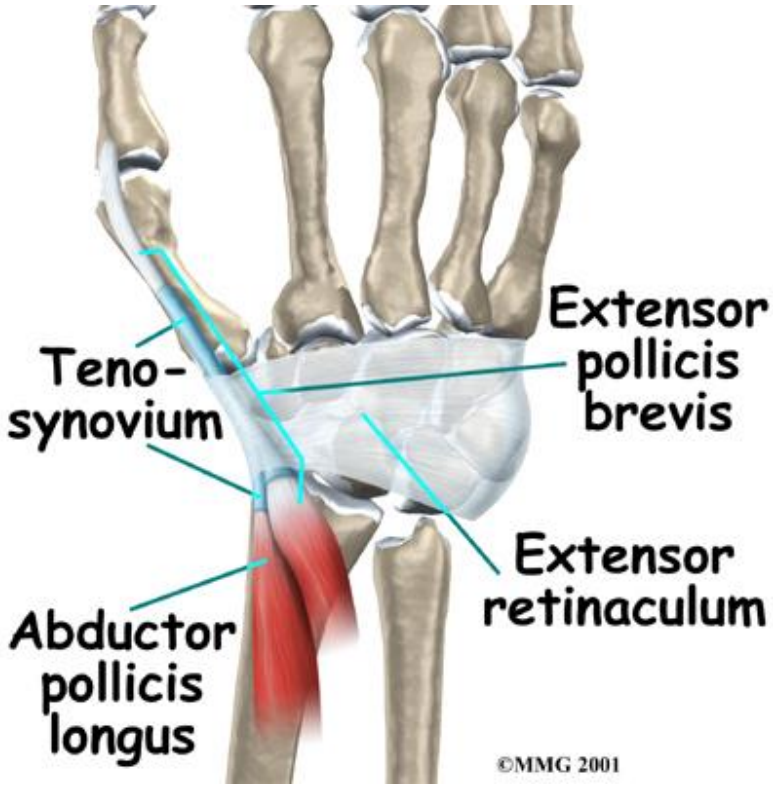
Extensor Pollicis Brevis :

Origin: Dorsal aspect of the Radius and Interosseous mambrane

Insertion : Base of Proximal Phalanx of Thumb

Action : Thumb Extension Wrist Abduction

Nerve Supply: Radial Nerve C6,C7



The abductor Pollicis Longus tendon lies anterior to the extensor Pollicis Brevis tendon. There may be an aberrant tendon in this compartment and the compartment may be bifid.

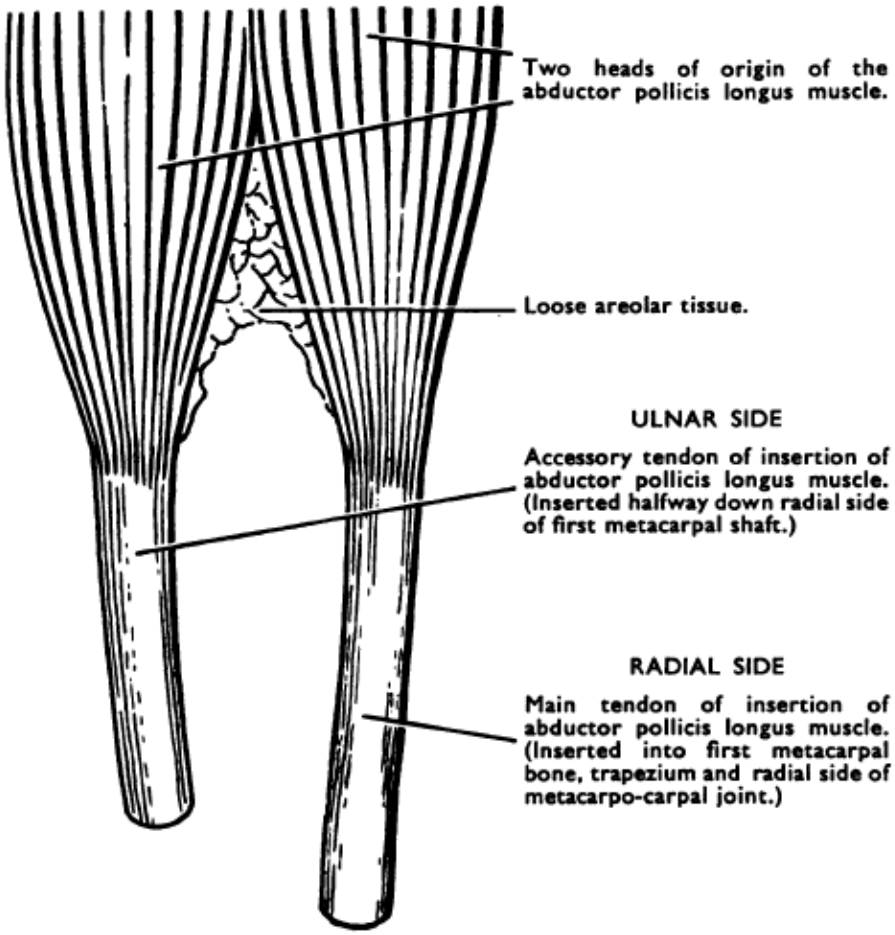
The dorsal cutaneous branch of the radial nerve pierces the deep fascia just proximal to the wrist joint. Three branches of this nerve passes superficial to the first fibroosseous canal Before innervating Thenar eminence, Radial half of Index finger and Thumb.

Applied Anatomy:

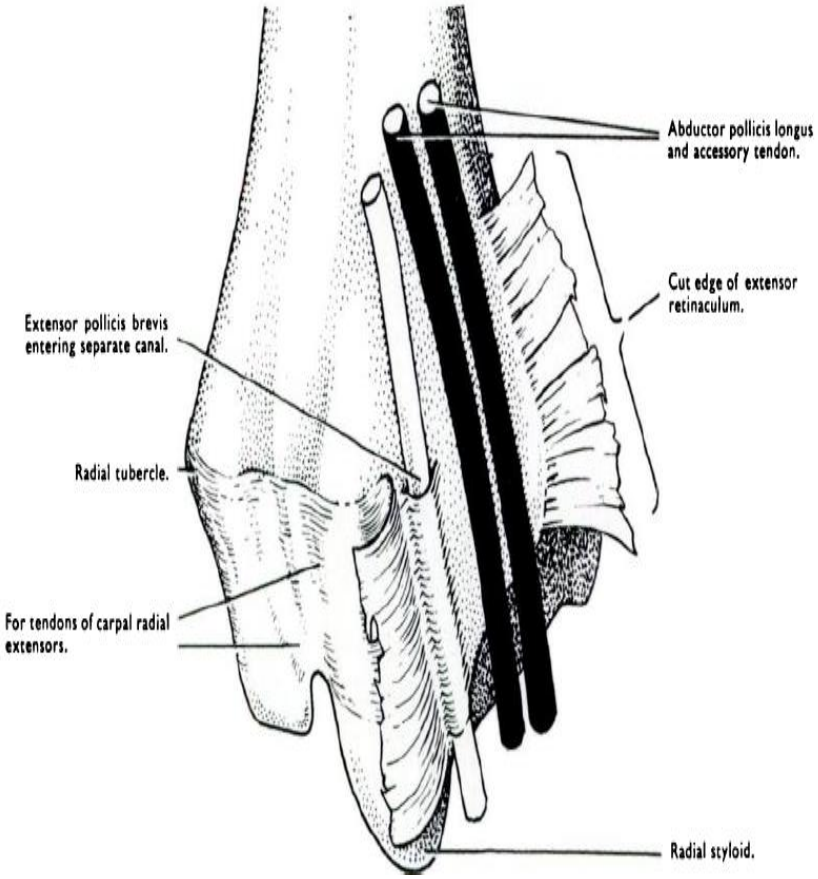
[5]The Abductor pollicis longus is subjected to tension & various angulations during different movements of the wrist .In large no of cases tendon may angulate to 105 degrees at the exit of fibrosseous canal which may further angulate during abduction of thumb. These angulations of these tendons at the exit exerts Tension and friction over the sheath stimulating fibrosis and thickening of the tendons.

In some cases there may be a aberrant tendon of Abductor pollicis longus inserting to the trapezium. In such cases the aberrant tendon goes unnoticed during surgical release leading to postoperative persistence of Pain.

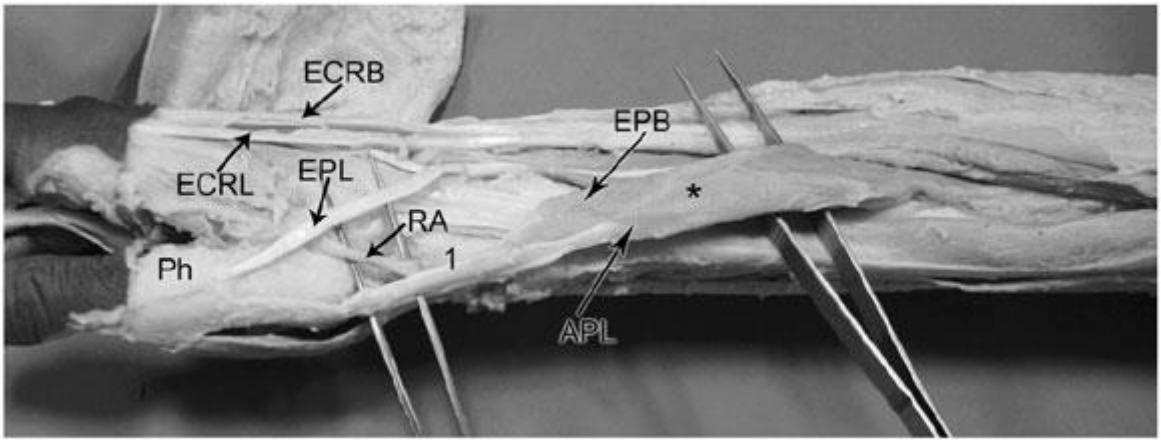
ANATOMICAL VARIATIONS:



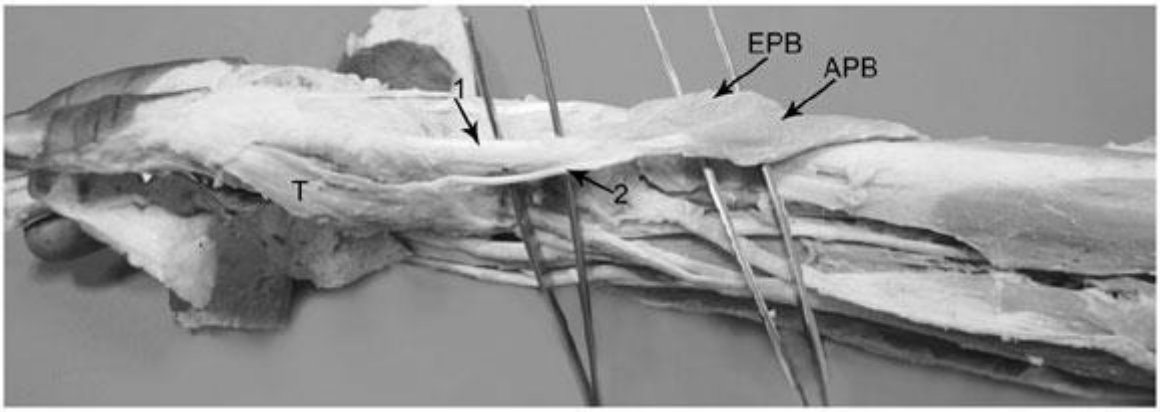
This picture shows an aberrant abductor pollicis longus which inserts at the trapezium.



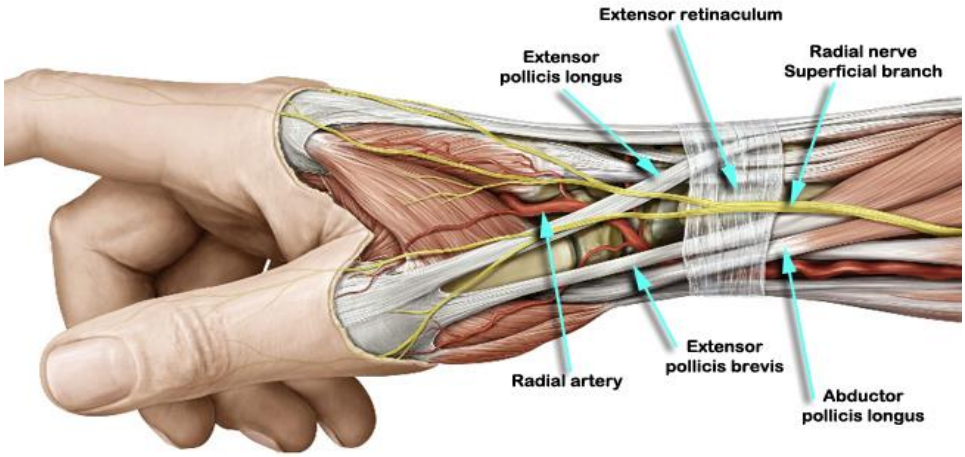
This picture shows double tendons of abductor pollicis longus



This picture shows congenital fusion of extensor pollicis brevis and abductor pollicis longus.



This picture shows congenital fusion of abductor pollicis longus and extensor pollicis brevis.



EXTENSOR MUSCLES

The posterior compartment contains the extensor muscles of the forearm and brachioradialis and supinator. Chronic tendinosis of the common extensor tendon origin produces lateral epicondylitis of the elbow leading to pain and disability

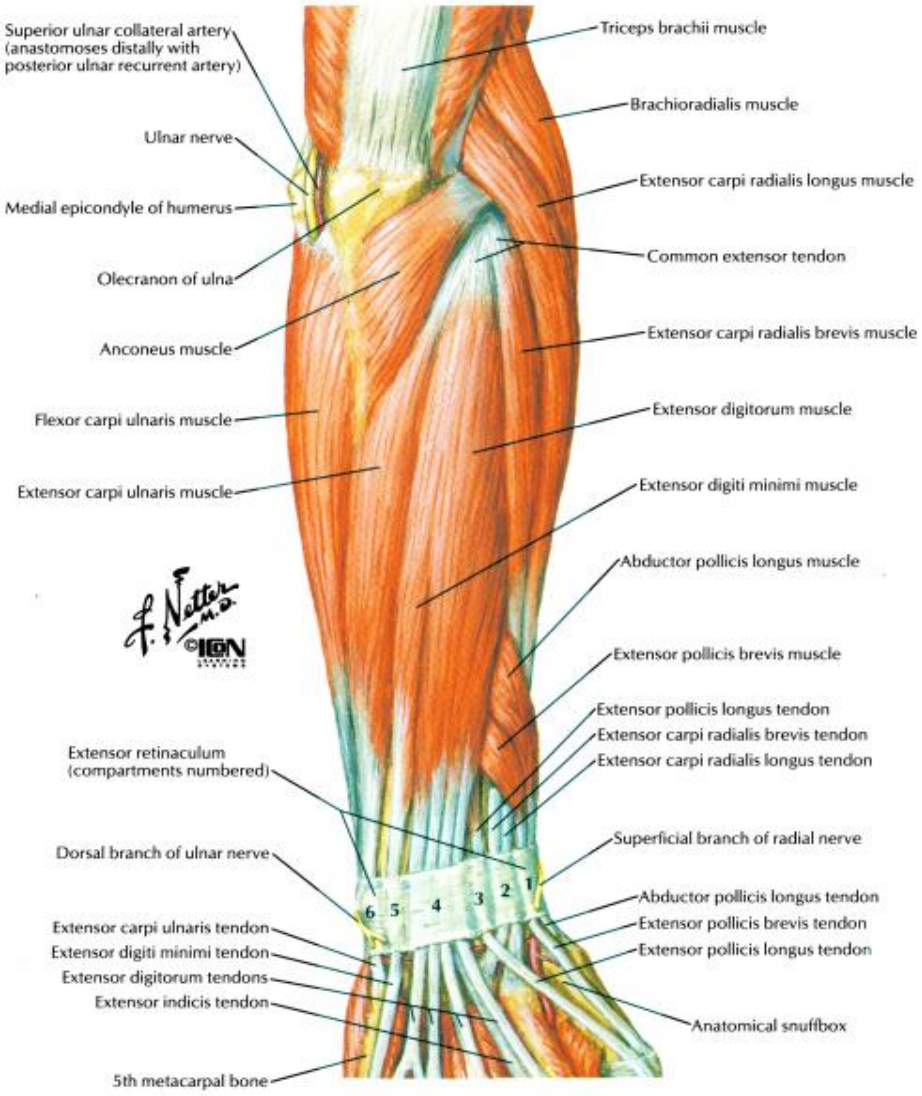


Fig 1: common extensor muscles of forearm[6]

Extensor carpi radialis brevis

Extensor carpi radialis brevis takes origin from the lateral epicondyle of the humerus as a tendon which it shares with other forearm extensors, the radial collateral ligament of the elbow joint, a strong aponeurosis which covers its surface, and an adjacent intermuscular septum. At mid-forearm muscular belly ends, continues as a flat tendon . The tendon passes deep to the extensor retinaculum and is inserted into the base of third metacarpal bone on the dorsal surface and its radial side, distal to its styloid process, and on adjoining parts of the second metacarpal base.

The tendons of both extensor carpi radialis longus and brevis may split into slips, which are variably attached to the second and third metacarpal bones. The muscles themselves may be united or may exchange muscular slips.

Extensor carpi radialis longus is longer than extensor carpi radialis brevis and is covered by it. The tendon passes deep to extensor pollicis brevis and abductor pollicis longus, then deep to

the extensor retinaculum, where it lies medial to the extensor carpi radialis longus tendon, in a shallow groove on the dorsal aspect of radius, and separated from it by a low ridge. Both these tendons share a common synovial sheath.

It receives arterial supply principally from two pedicles. One is a branch from the radial recurrent artery, and the next is a branch of the radial artery which arises about proximal one third of the forearm. An additional blood supply proximally from branches from the radial collateral branch of the profunda brachii artery. Nerve supply is from the posterior interosseous nerve with root value C7 and 8.

It produces as an extension and abduction of wrist and midcarpal joints along with extensor carpi radialis longus. It has synergistic action with the finger flexors while making a fist. Extensor carpi radialis brevis tendon is palpated when the wrist is extended and abducted against resistance with the forearm in pronation.

Extensor digitorum

Origin of extensor digitorum is the lateral epicondyle of humerus via the common extensor tendon, the adjacent intermuscular septum and the antebrachial fascia . Distally it divides into four tendons, along with extensor indicis tendon it forms common synovial sheath,then it passes deep to extensor retinaculum. On the dorsum of the hand these tendons diverge, one to each finger. Extensor indicis accompanies the tendon to the index finger. Three variable intertendinous connections (also known as juncturae tendinae) connects adjacent tendon on the dorsum of the hand, which are inclined radially and distally. On the dorsum of the proximal phalanges these digital attachments enter a fibrous expansion

The extensor tendon to the index finger lies lateral to the extensor indicis tendon. The extensor tendon to the little finger lies lateral to the tendon of extensor digiti minimi.

The proximal 1/3rd of extensor digitorum is supplied by branches from the radial recurrent artery, and the distal 2/3rd is

supplied by branches from the posterior interosseous artery. The most distal portion is supplied by a perforating branch from the anterior interosseous artery which passes through the interosseous membrane. It is innervated by the posterior interosseous nerve, C7 and 8.

The tendons of extensor digitorum can be readily felt, and usually seen, when the fingers are extended against resistance and the forearm in pronation.

ANATOMY OF WRIST JOINT:

[5]Wrist joint is a synovial joint of ellipsoid variety between lower end of RADIUS AND 3 LATERAL bones of proximal row of carpus.

SURFACE MARKING:

The joint line is obtained by joining the styloid processes of the radius and ulna. It is CONVEX UPWARDS. The joint neither communicates with the inferior radioulnar joint nor with intercarpal joints.

ARTICULAR SURFACE:

UPPER: Inferior surface of the lower end of radius and articular dis of inferioe radioulanar joint.

LOWER: scaphoid, lunate, triquetral bones

LIGAMENTS: 1.The articular capsule surround the joint.it is attached above to the lower ends of radius and ulna and below to the proximal row of carpal bones. A protrusion of synovial membrane called the prestyloid recess lies in front of the styloid

process of ulna and in front of the articular disc.it is bounded inferiorly by a small meniscus projecting inwards from the ulnar collateral ligament between the styloid process and the triquetral bone. The fibrous capsule is strengthened by the following ligaments.

2. On the palar aspect there are 2 palmar carpal ligaments.

The palmar radioarpal ligament is a abroad band.it begins above from the anterior margin of the lower end o the radius and its atyloid process.it runs downwards and medially and is attached below to the anterior surfaces of the scaphoid, lunate and triquetral bones.

The palmar ulnocarpal ligament is a rounded fasciculus.it begins above from the base of the styloid process of the ulna and the anterior margin of articular disc and runs downwards and laterally and is attached to lunate and triquetal bones. both palmar carpal ligaments are considered to be intracapsular

3. On the dorsal aspect of the joint, there is one dorsal radioarpal ligament. It is weaker than palmar ligamnets.it begins above from

the posterior margin of the lower end of radius, runs downwards and medially and is attached below to the dorsal surfaces of scaphoid lunate and triquetreal bones

4. The radiocollateral ligament extends from the tip of styloid process of the radius to the lateral side of scaphoid bone.it is related to radial artery.

5. The ulnar collateral ligament extend from the tip of the styloid process of the ulna to the triquetral and pisiform bones both the collateral ligamnets are poorly developed.

RELATIONS:

Anterior: long flexor tendons with their synovial sheaths and median nerve.

Posterior: extensor tendons of the wrist and fingers with their synovial sheath

Lateral: radial artery

BLOOD SUPPLY:

Anterior and posterior carpal arches

NERVE SUPPLY: Anterior and posterior interosseous nerve.

MOVEMENTS: Movements of the wrist are associated with movements of the mid carpal joint active movements of the wrist joint are:

Flexion: it takes place more at the midcarpal than at the wrist joint main flexors are

1. flexor carpi radialis, flexor carpi ulnaris, palmarislongus

The movement is assisted by the long flexors of fingers and thumb and abductor pollicis longus.

2.EXTENSION: It takes place mainly at the wrist joint main extensors are:

The extensor carpiradialis longus, extensor carpi radialis brevis, extensor carpi ulnaris.it is assisted by the extensors of the fingers and thumb.

3.ABDUCTION: It occurs mainly at he midcarpal joint. the man abductors are flexor carpi radialais, extensor carpi radialis longus and brevis, abductor pollicis longus and the extensor pollicis brevis.

4.ADDUCTION: It occurs mainly at wrist joint. the main adductors are flexor carpi ulnaris and extensor carpi ulnaris.

5.CIRUMDUCTON: THE RANGE OF FLEXION IS MORE THAN THAT OF EXTENTION SIMILARLY RANGE OF ADDUCTION is greater than abduction[due to the longer styloid process of radius]

FIRST CARPOMETACARPAL JOINT: The only carpometacarpal joint which has separate joint cavity. Movements at his joint are therefore much more free than at any other corresponding joint.

It is saddle variety of synovial joint because the articular surfaces are concavo-convex.

Articular surfaces:

1. The distal surface of trapezium,2nd proximal surface of the base of the 1st metacarpal bone.

LIGAMNTS: 1.Capsular ligament surround the joint.it is thick but loose and is thickest dorsally and laterally

2.Lateral ligaments a broad band which strengthens the capsule laterally.

3.Antreior ligament:

4.Posterior ligaments are oblique bands running downwards and medially.

RELATIONS:

Anteriorly, the joint is covered by the muscles of the the nar eminence. posteriorly there are long and short extensors of the thumb. medially there is the first dorsal interosseos muscle and the radial artery, laterally there is the tendon of abductor pollicis longus.

BLOOD SUPPLY:

Radial vessels supply blood to the synovial membrane and the capsule of the joint.

NERVE SUPPLY:

First digital branch of media nerve supplies the capsule of the joint.

MOVEMENTS:

Movements occur at the carpometacarpal joint:

Flexion and extension of the thumb takes place in the lane of the palm. abduction and adduction at right angles to the plane of the palm. In opposition the thumb crosses the palm and touches other fingers, flexion is associated with medial rotation, and extension with lateral rotation at the joint,

Circumduction is a combination of different movements mentioned.

The following muscles bring about the movements:

1. flexion:flexor pollicis brevis and opponents pollicis

2.extension.abductor pollicis longus,extensor pollicis brevis, ecxtensor pollics longus

3.ABDUCTION: ABDUCTOR POLLISIS longus and brevis

4.ADDUCTION:Adductor pollicis

5.OPPOSITION:Opponens pollicis and flexor pollics brevis

The adductor pollicis and the flexor pollicis longus exert pressure on the opposed fingers.

Movements occurring at the metacarpophalangeal joint:

-Flexion

-Extension

-Abduction

-Adduction

Movements at interphalangeal joint level:

-Flexion

-Extension/Hyperextension

PATHOLOGY:

[7]The pathological changes includes inflammatory changes caused by repetitive trauma by continuous movements of tendon

involving tendon sheath which may ultimately resulting in fibrosis and thickening of Tendon sheath.

The inflammatory changes are,

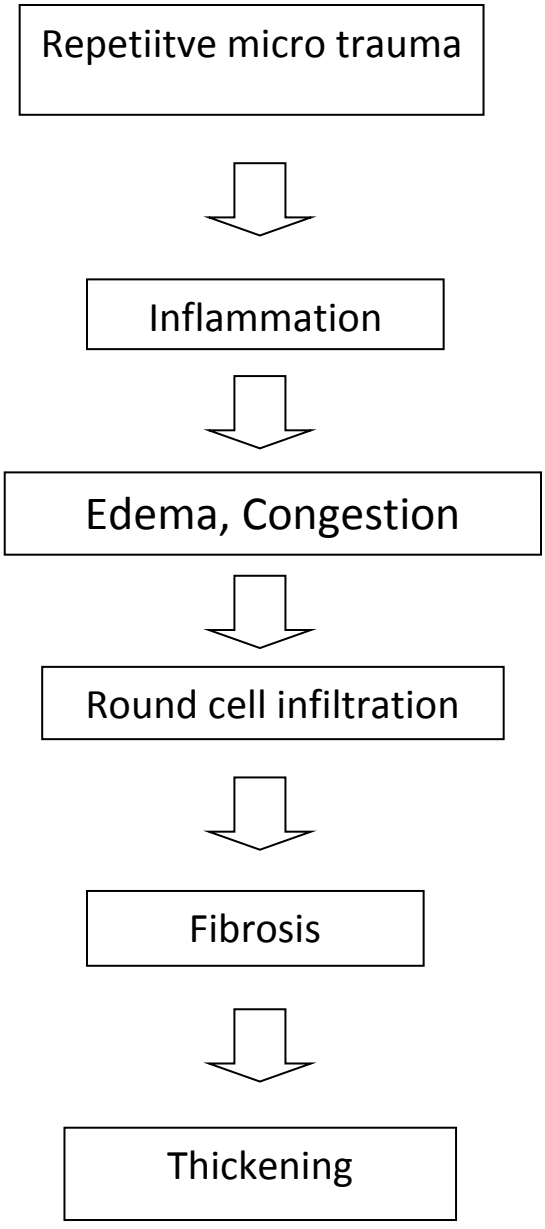
- serous effusion within the sheath,
- edema and round cell infiltration of sheath wall,
- increased vascularity and thickness of wall,
- Marked thickening of dense fibrous layers with hyaline degeneration.

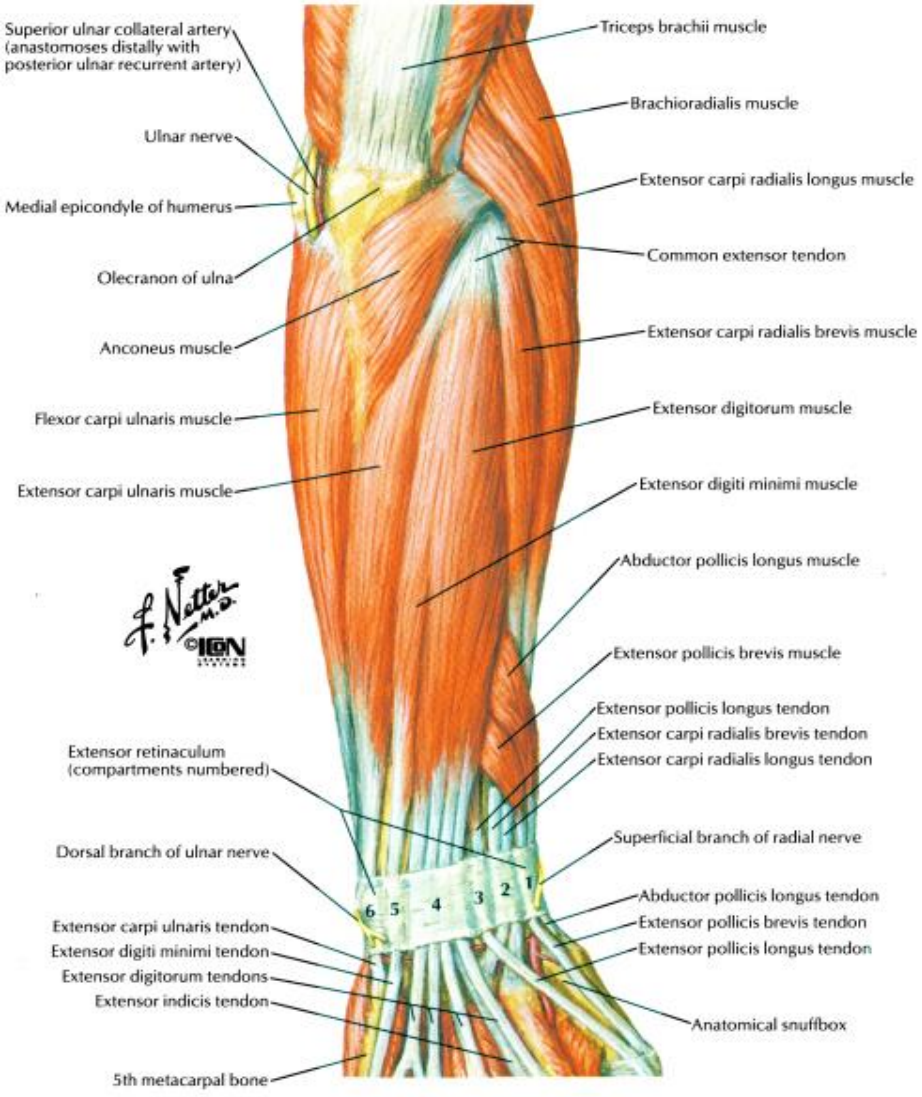
Depending on the inflammatory stage the pathological findings may differ

- Tendon sheath may become 3 to 4 times thicker than normal ,
- The Tendon sheath may loose the white shiny appearance and may become hyperemic.
- Adhesions may be seen between tendon and tendon sheath.
- Tendon sheath shows excessive thickening similar to the consistency of cartilage

This picture shows the relationship between the 1st extensor compartment and extensor retinaculum

PATHOGENESIS:

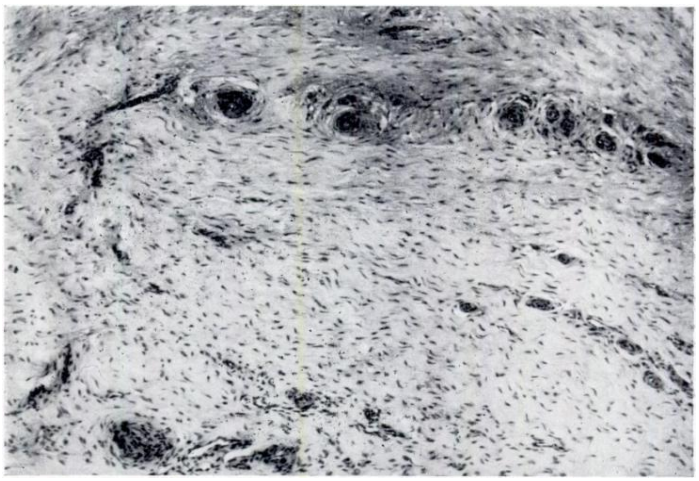


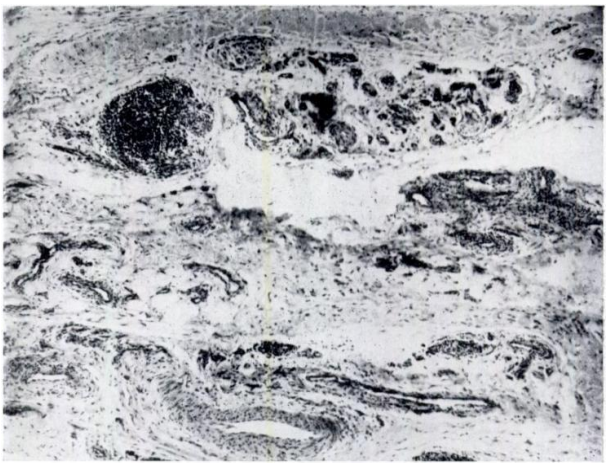


[6]This picture shows the various relationships between the extensor compartments, neurovascular structures and bony structures.

Histology:

Microscopically the features are those of a non-specific chronic inflammatory process





Thickened tendon sheath showing

fibrosis, thickening of small vessels, and some mucoid change which appears as loose

Perivascular

accumulation of wandering cells, fibrosis and increase in the number of blood vessels.

Clinical evaluation:

Symptomatolgy:

- The typical picture described by deQuervain consists of pain radiating from the radial styloid process, down the thumb, and up the forearm, slight swelling in the region of the tendon sheath, pain on movement of thumb and wrist, and inability to grasp objects firmly. The chief complaint is either pain in the wrist on using the thumb, or dropping articles because of pain or insecure grip. Strong active abduction of the thumb is painful. The Finkelstein test is probably "the most pathognomonic objective sign." Pain, consequent to strong flexion of the wrist, is also an indication.

CAUSES:

The exact cause is not known. Repititive strain is the most common cause. Women are commonly affected than men.

Probable causes are:

- Repetitive household activities like washing clothes, cleaning vessels, lifting children, house cleaning using broomstick

-In mechanics using screw drivers

-Carpenters,weight lifters,hotel workers,wood cutters,computer and typewriting workers, piano players

-in pregnancy chances of acquiring dequervain’s disease is more because of hormone influences and water retention.

MANAGEMENT:

- **Investigations[7]**

- Clinical

-Finkelstein test[8]

- Imaging

-Xray

-MRI

-Ultrasound

- **Treatment**

- Non-Surgical

- Surgical

CLINICAL:

Finkelstein test: Thumb opposed and clasped by other fingers.

- This test consists essentially in ulnar deviation and opposition of the thumb. To carry this out, the fingers clasp the thumb in an opposed position, prior to ulnar deviation of the wrist. Occasionally there may be found thickening and visible swelling about the radial styloid process. Roentgenograms are non-contributory except in different diagnosis, although occasional rarefaction of cancellous bone of the radial styloid may be present[8].

INVESTIGATIONS:

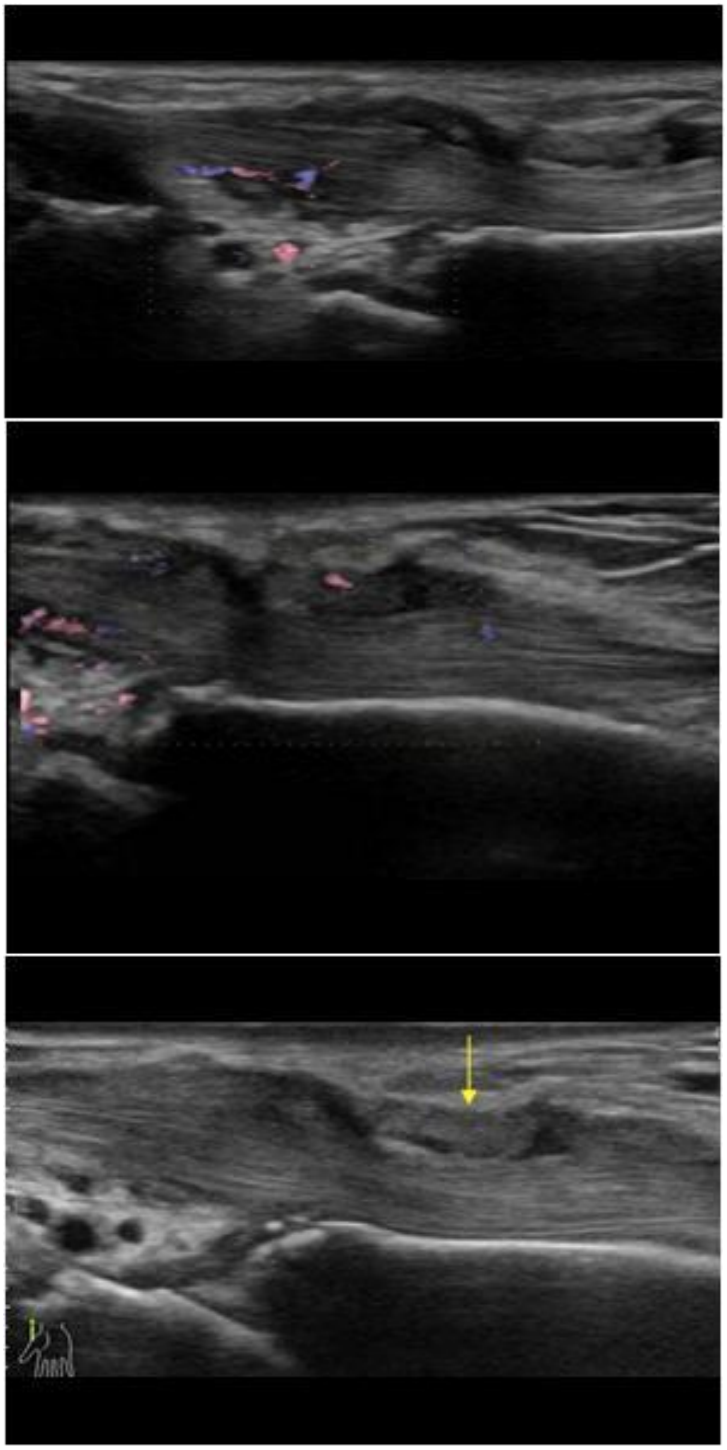
XRAY:

-  Localised osteopenia at the radial styloid in long standing cases
    - Periosteal reaction in case of tuberculous osteitis
    - Fractures of the adjacent bones
    - USG
    - MRI
    - Routine Blood Investigations

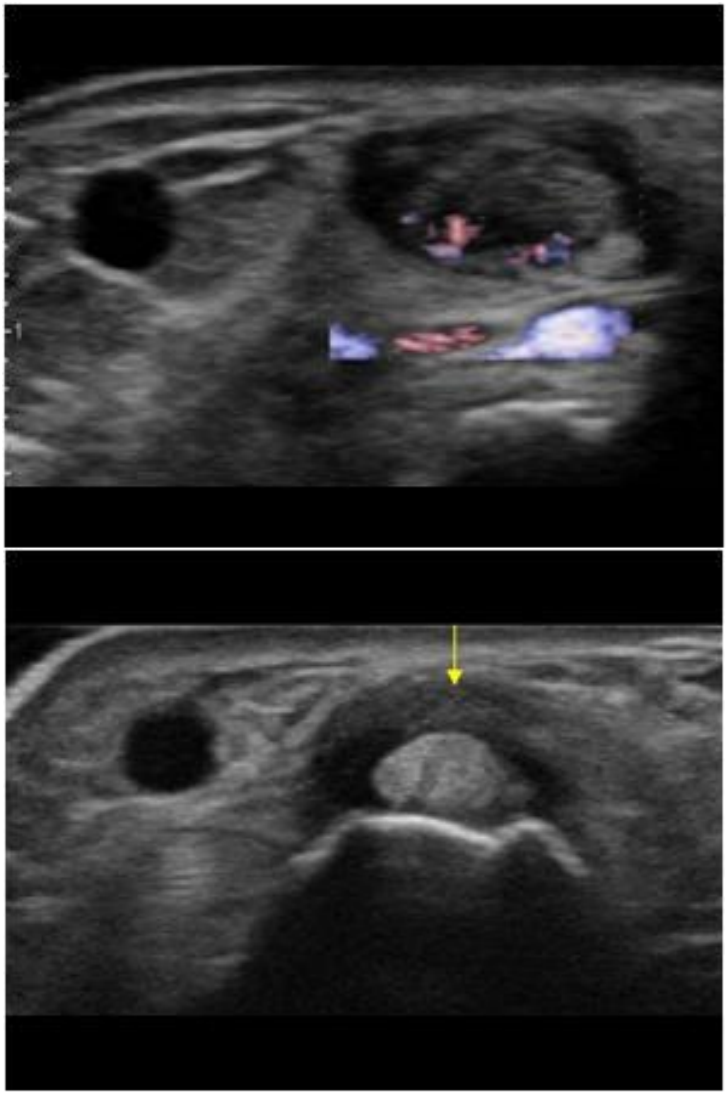
- Hb,TC,DC,ESR,RA Factor,VDRL,X-Ray chest,

  Serum uric acid.

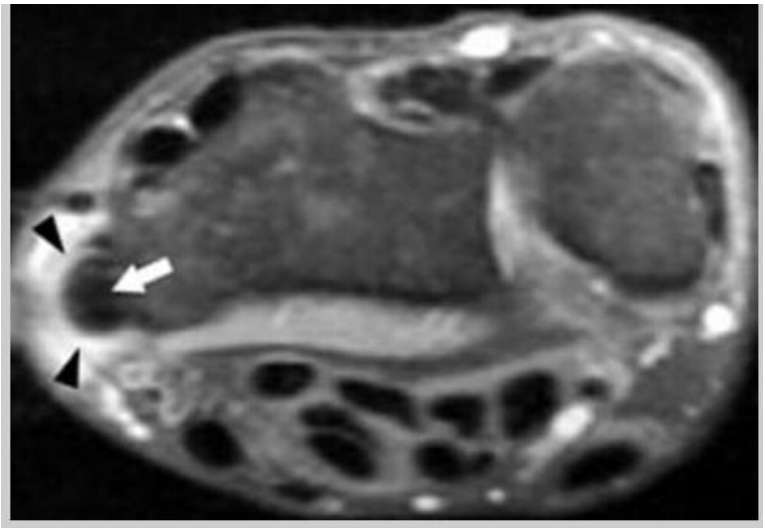
- USG : Tendon sheath thickening [9]



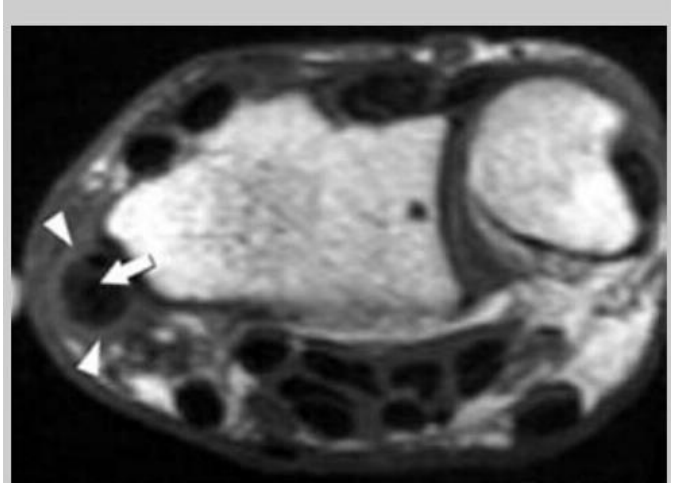
This picture shows edema of tendon sheath,thickening of the tendon sheath of abductor pollicis longus and extensor pollicis brevis.



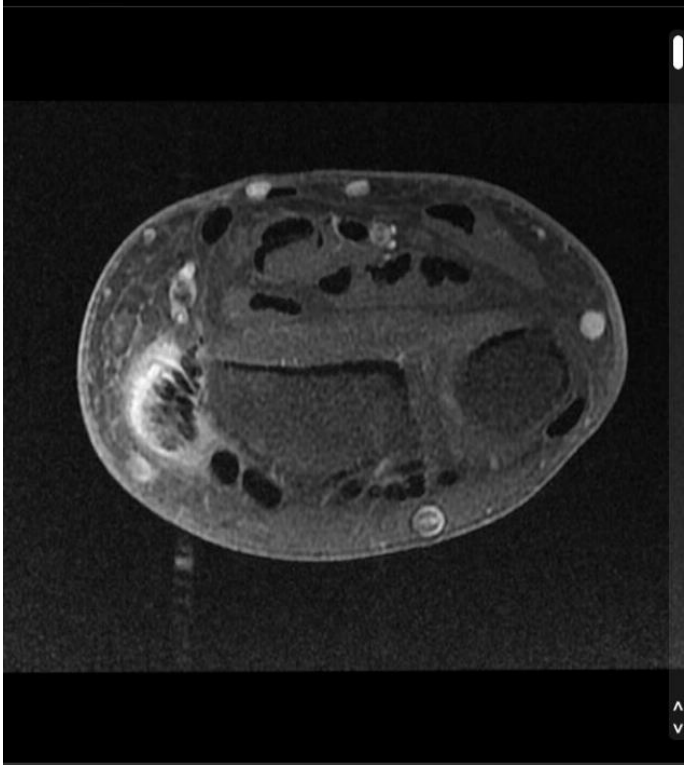
- MRI : Thickening of the first extensor compartment tendons of the wrist(Extensor pollicis brevis & abductor pollicis longus)[9]



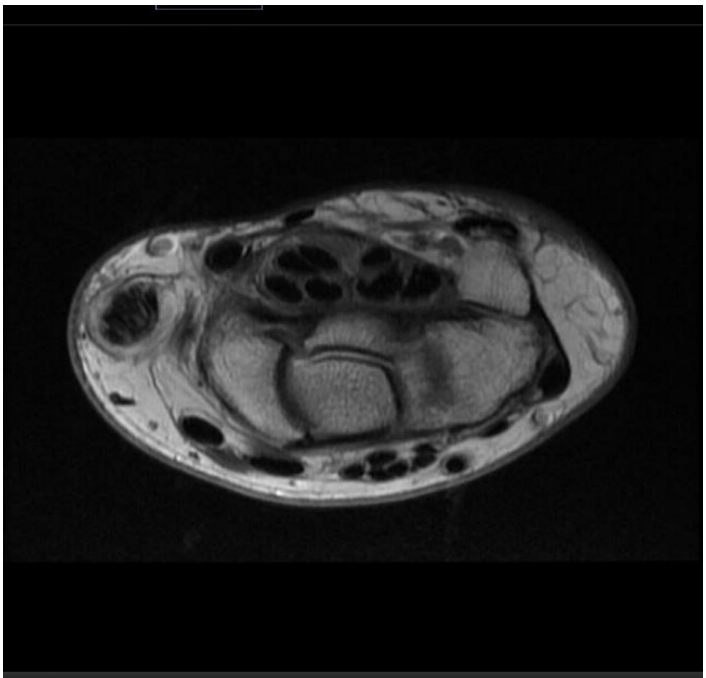
This picture shows circumferential thickening of the 1st extensor compartment.



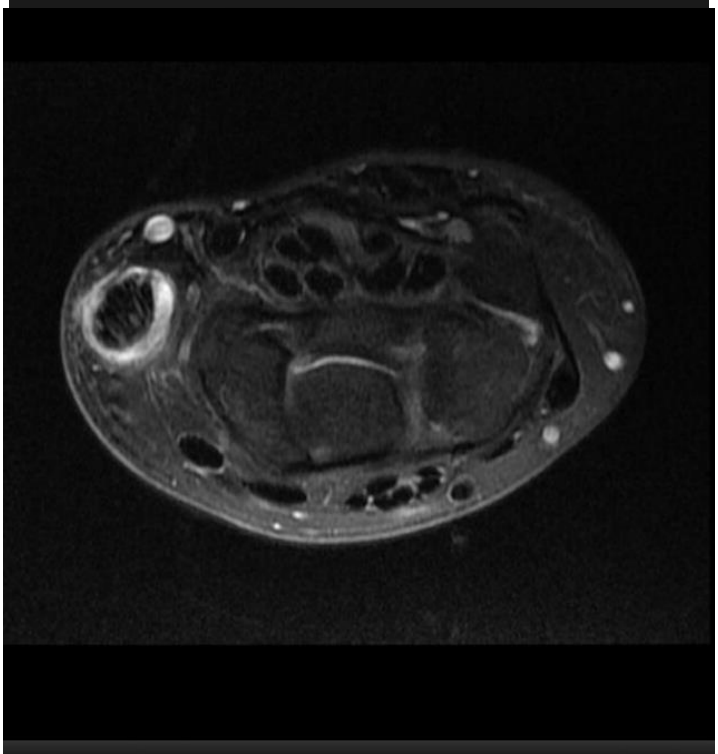
PD
De Quervain tenosynovitis (coronal PD)



De Quervain tenosynovitis (C+ FS)



PD
De Quervain tenosynovitis (axial PD)



T2 fat sat
De Quervain tenosynovitis (axial T2 FS)

This picture shows focal osteopenia of radial styloid region in long standing cases

Differential diagnosis for deQuervain‘s[7]

Diseases:

1. Tuberculous tenosvnovitis

2. Tuberculous osteitis

3. Gout

4. Gonorrhea

5. Syphilis

6. Neuritis

7. Rheumatoid arthritis.

8. Sprains of the wrist

9. Hypertrophic arthritis

10. Ganglion of the wrist

11. Bursitis

12. Aseptic necrosis

13. Interstitial calcinosis

14. Senile processes in joint capsules

15. Sprain of external lateral ligament. Differential diagnosis

Rheumatoid arthritis:[7]

64-95% of the rheumatoid arthritis patients will have tenosynovitis of wrist and hand. Initially it starts with syanovial lining of the tendon sheath. Or it may involve adjacent joints. Swelling noted over the entire length of syanovial lining of the tendon sheath. From distal retinaculam to metacarpal base which can be easily differentiated from ganglion and lipomas. Rheumatoid arthritis may cause flexor tenosynovitis and adjacent median nerve involvement.

In RA, de quervains may manifest as painful boggy swelling on the radial styloid region of the involved wrist .

Crystalline tendinopathy (gout):[7]

Gout is a disorder of uric acid metabolism which causes hyperuricemia and uricosuria due to either impaired uric acid excretion or overproduction. It occurs due to precipitation of the crystalline materials over the closed compartment of the tendon sheath which cause irritation of the sheath, edema, inflammation and finally stenosis. In gout main cause for tendinopathy is low solubility of mono sodium urate which causes crystallisation and

deposits.it be ruled out by gouty nodules and elevated serum uric acid and elevated uric acid level in urine.

Other calcific tendinitis:[7]

Usually it is common in men around 40-60 years. Main initiating agent is deposition of calcium hydroxylapatite, which deposited in the synovial sheath. It may be associated with systemic features of hypercalcemia and ectopic calcification elsewhere in body. X ray features will show fluffy calcification of the involved segment. It frequently confuses with infective tenosynovitis.

Pseudogout:[7]

It is due to deposition of calcium pyrophosphate dihydrate. Radiography reveals fluffy soft tissue calcifications. Pathological examination shows rhomboid shaped crystals usually positive birefringement crystals.

Amyloidosis:[7]

It occurs due to deposition of amorpheous amyloid materials which contains beta 2 microglobulins. Mainly due to plague like accumulated material in tendon sheath. Hand and wrist involvement of amyloidosis usually involves with cystic lesions of

the carpal bones and destructive arthropathy of wrist and interphalangeal joints. Complete removal of the plaque material from tenosynovium which effectively relieves the symptoms usually do not recur.

Ochronosis:[7]

Its a autosomal recessive disorder of tryptophan metabolism by defective production of homogenesitic acid. Unmetabolised homogenesitic acid materials deposited in the tenosynovium produces tenosynovitis which produces deep staining of collagen tissues. It is diagnose clinically by dark pigmentation of urine by sun exposure.

Sarcoidosis:[7]

Systemic immune mediated inflammatory disorder which cause nodules over wrist and hand especially over tendon sheaths. Its a granulomatous inflammatory nodule. 24% sarcoid patients will have wrist and hand involvement. Systemic corticosteroids and surgical tenosynovectomy will be very useful.

Tuberculous osteitis and tenosynovitis:[7]

It is caused by mycobacterium tuberculosis. Usually secondary to pulmonary lesions. Prodromal symptoms of tuberculosis , elevated esr, montoux positivity will be there in many of the patients. Afb staining positive organisms, caseous necrosis, giant cell granuloma will be there.

Syphilis and gonorrhoea:

It is a sexually transmitted disease that causes rarely arthritic and tendon involvement. Severe tenderness will be found in those patients who are having nodules. It is ruled out by VDRL testing and gram staining of lesions.

Carpomatacarpal arthritis:

X ray features will clinch the diagnosis that is noted by erosion , sclerosis and joint space narrowing of carpometacarpal region.

Lidocaine injection into the carpometacarpal joint will reduce the pain which confirms the diagnosis.

Old scaphoid fracture:

History of trauma and x ray will clinch the diagnosis of old non union or avascular necrosis of proximal segment of scaphoid.

Sprains of the lateral ligaments of wrist:

History of trauma and MRI will show the sprain over ligaments by inflammation , edema and rupture.

Congenital synostosis between the scaphoid and trapezium

Neuritis:

It is diagnosed by numbness and buring sensation along the nerve course in forearm and wrist.

Ganglion and bursitis:

It is liquefactive degeneration of the tendon synovial sheath which contains gelatinous material. it shows transverse mobility . it is painless semi globular swelling , firm in consistency. Sometimes it presents as a compound palmar ganglion as dumb bell shaped swelling.

Among all the differential diagnosis, only sprains of the lateral ligaments of wrist is difficult to differentiate.

- The last diagnosis, sprain of the exterior lateral ligament, is alone difficult to differentiate.

TREATMENT:

Non Surgical Treatment

Medical Management:

- NSAIDs

- Rest

- Ice Application

- Splint

-ultrasonic massage

Steroid Injections:[11]

- 40 mg of methylprednisolone

<u>Disadvantages</u>

- Extensor pollicis brevis compartment will be often missed.[12]

- Depigmentation

- Recurrence

-Tendon rupture

PHYSIOTHERAPY:

High frequency ultrasonic massage over the radial styloid region will reduce the tendon sheath edema and thereby subsiding the inflammation and further progress of thickening of tendon sheath.

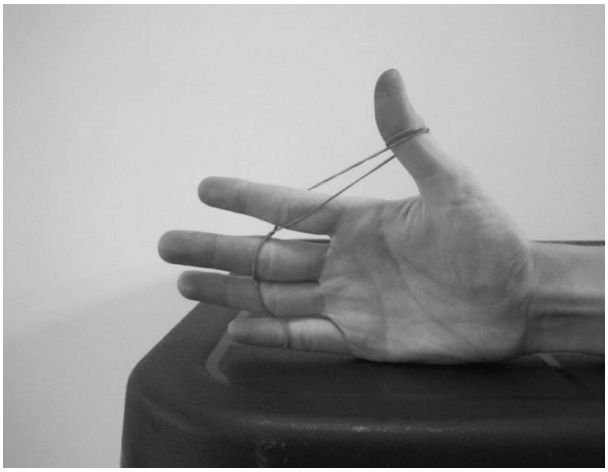
THE ECCENTRIC TRAINING PROTOCOL:

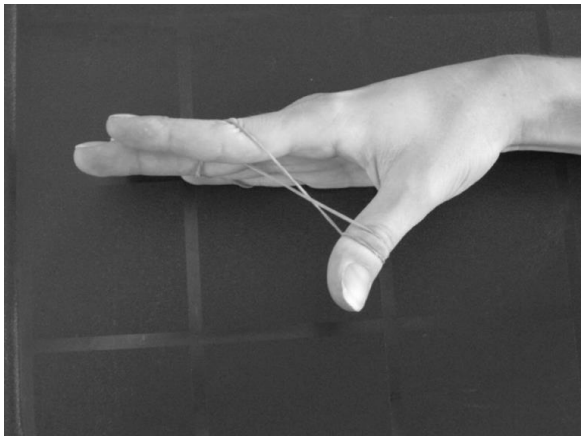


[13]THE WRIST IS HELD IN HAMMER HOLDING POSITION WITH DEVIATION TOWARDS THE ULNAR SIDE

Avoiding the movements on the radial side[lateral side]

(radial deviation)

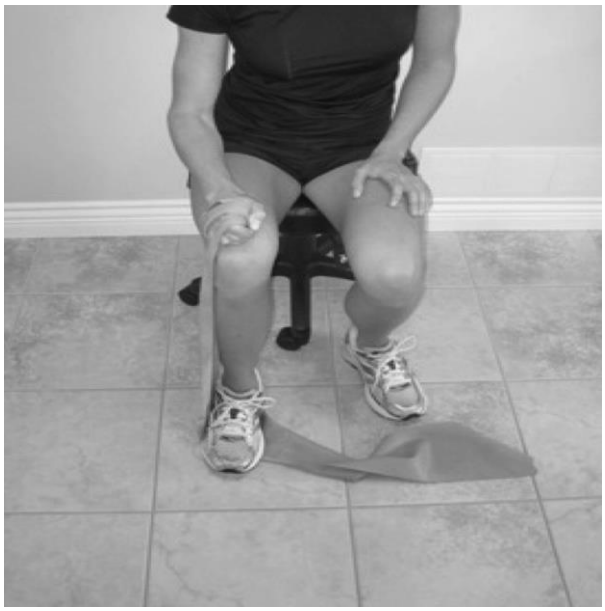




Initial position of extension of thumb:

Initial position for adduction of thumb.


Flexion.




Starting position for eccentric forearm

Pronation

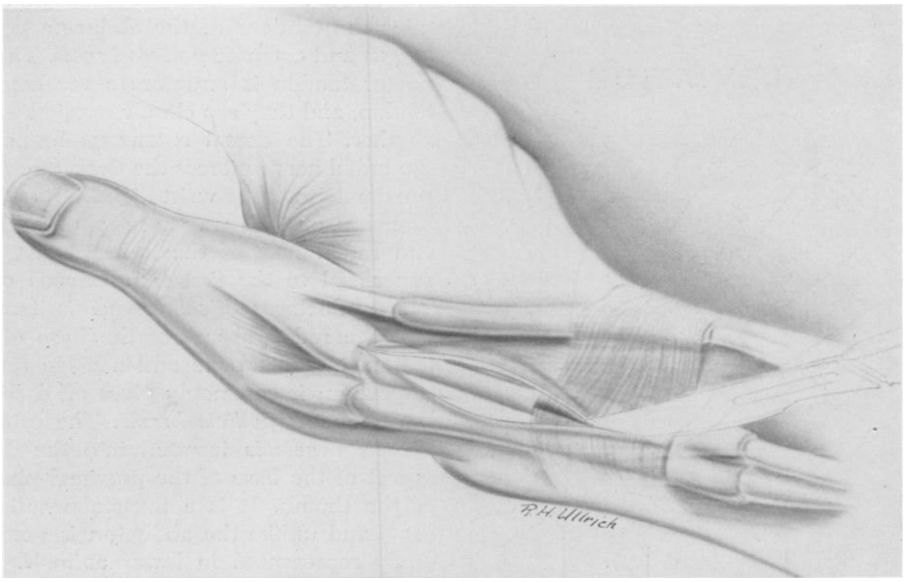
Starting position for eccentric forearm

Supination

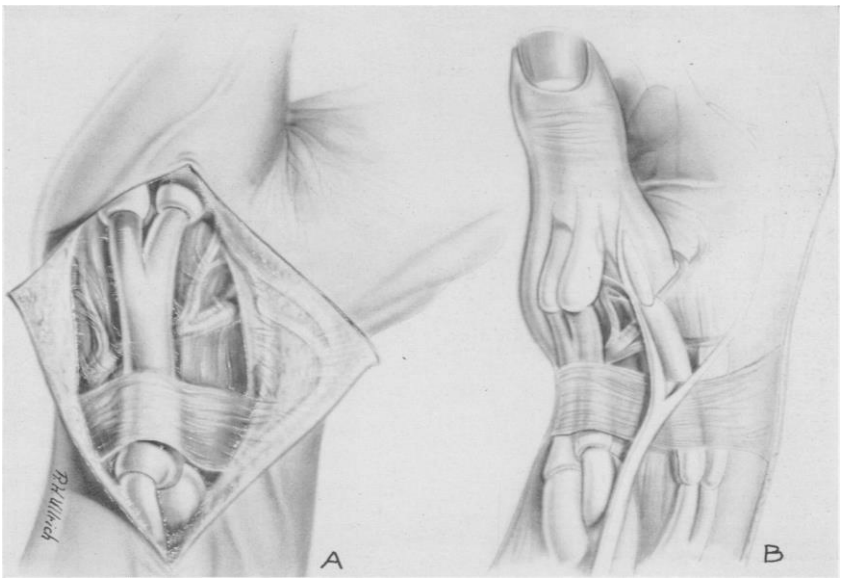
Even though all these treatment options are available, these are temporary measures for pain relief and the constrictive band does not resolve.

The definitive treatment is the surgical release of the constrictive band.

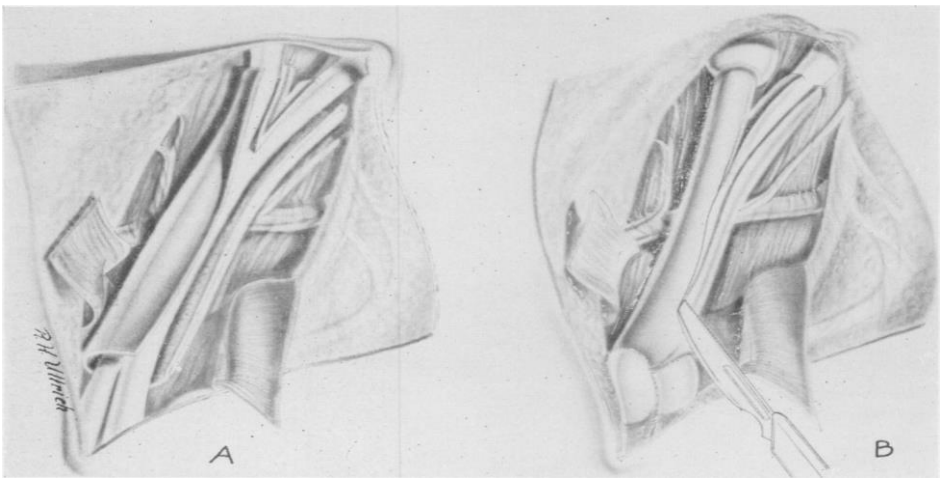
SURGICAL TREATMENT:



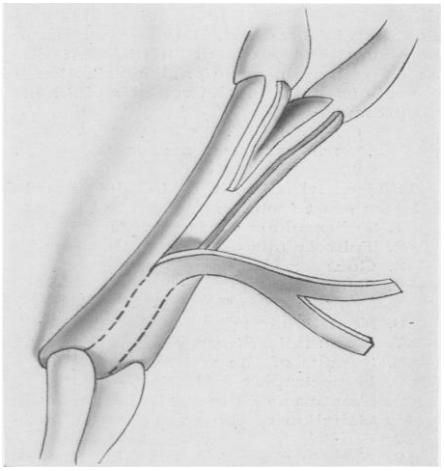
Depicts the type of longitudinal incision[15] made over the anterior border of the anatomical snuff box with its center at the radial styloid. The pathological processes lie immediately deep to the skin incision[14].



A and B. Illustrate the anatomical position of the cutaneous branch of the radial nerve and the ease with which it may be injured. By carrying the original incision down to the tendon sheath and then elevating skin flaps with the subcutaneous fascia and fat laterally, the nerve can be retracted laterally with the skin flaps, and thus not be injured



A and B. Illustrate the division of the dorsal carpal ligament to expose the entire fibrosed tendon sheath and the manner of division of the sheath itself here diagrammatically represented as greatly thickened. Constriction by the sheath and bulging of the tendon has been diagrammatically exaggerated



Tendonsheath should not only be incised, but excised to prevent recurrence of a stenotic sheath

Advantages of longitudinal incision:

-easy recognition of the anatomical compartment variations

-easy identification of superficial branch of the radial nerve

-dorsally based incision with restraining volar based flap.

Disadvantage:

Scar adheres to the underlying structure

Scar hypertrophy

Advantages of transverse incision:

-Easy exposure

-Scar hypertrophy will be minimal

Disadvantage:

-Chances of injury to the superficial branch of radial nerve is more

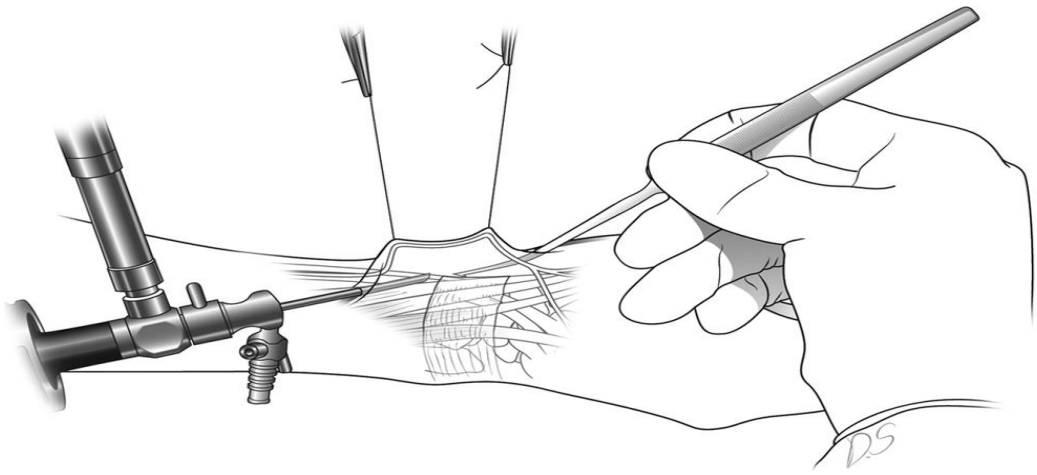
-Difficult to trace the anatomical variation

ENDOSCOPIC RELEASE:

The finding that patients who underwent endoscopic release had significantly better outcome scores[16]

Scar pain and hypertrophy contribute to dissatisfaction after operative treatment

No radial nerve complications in the endoscopic group



Surgical Release Complications:

Superficial wound infection

Sensory deficit of superficial radial nerve

Incomplete release

Scar pain, scar hypertrophy

Subluxation of the tendon of first extensor compartment[17]

Complications can be avoided by,

- Incising the retinaculum on its dorsal aspect to create a volar based restraining flab

Subluxation can be treated by following methods[18]

1. Brachioradialis tendon flab
2. Retinacular sling

Sometimes dequervain’s disease is due to isolated entrapment of extensor pollicis brevis.in these type of cases it is sufficient to decompress the septum which contains subcompartment of extensor pollicis brevis which relieves the pain tremendously.

Management of complications:

Dysaesthesia in the distribution of the radial nerve:

Reoperation of the first extensor compartment. Identify the fibrous remnant of the sheath which elevates the superficial branch of radial nerve excision of the fibrous tissue will relieve the symptoms.

Neuroma:

After identifying the painful neuroma by clinical or nerve conduction study, reexploration and excision of neuroma and reapproxiamtion of the divided portion of the nerve.

Palmar subluxation of the abductor pollicis longus and extensor pollicis brevis:

-Dorsally based incision **l**eaving the palmar based[volar based] restraining flap of extensor retinaculum will avoid the subluxation of tendons.

- subluxation of the tendons of 1st extensor compartment is treated by distally based flap of the brachioradialis tendon[18]. This will prevent the tendon prolapse

MATERIALS AND METHODS

In our institution 20 dequervain's disease patients resistant to conservative treatment were selected for this prospective study. The study period is from September 2013 to September 2014.20 patients were treated with open surgical release of tendon sheath along with removal of thin strip of extensor retinaculum.

Based on our inclusion and exclusion criteria, only resistant cases were included in our study.

OCCUPATION:

House wife:

Manual worker:

INCLUSION CRITERIA:

- Atleast 3 months of unsuccessful conservative therapy
- Pain interfering with daily activities of living
- Patient Age: 18 to 70
- Both sexes

EXCLUSION CRITERIA:

Comorbid conditions not permitting major surgical procedures

- Patient not willing for surgery
- Pregnancy
- Local arthritis
- Previous surgeries
-Hypothyroidism
-Rheumatoid arthritis

AGE AND SEX DISTRIBUTION: open surgical release of tendon sheath along with removal of thin strip of extensor retinaculum were done for 20 patients of which 19 were female and 1 was male.

PREOPERATIVE ASSESSMENT:

VAS(Visual Analog Scale)

DASH Score(0 to 100)

Verbal Pain Rating Scale

- 0 □ No Pain
- 10 □ Worst Pain
- ADLS(Activities of daily living)

Eg:

- Meal preparation, carrying laundry and groceries, home cleaning, picking up children

TIMING OF INTERVENTION:

Only resistant cases, after 6 months of other conservative measures were included in this study

ANAESTHESIA AND POSITION:

Under local anaesthesia, under pneumatic tourniquet control, patient in supine position, involved limb kept over the forearm table.

Before rising the pressure in tourniquet, thorough exsanguination done using esmarch rubber bandage for better visualization of constricted tendon sheath.

Incision is made over the anterior border of the anatomical snuff box centering the radial styloid. subcutaneous tissues exposed after identifying the constricted tendon sheath, incision is made on the tendon sheaths of abductor pollicic longus and extensor pollicis brevis.

2 to 3mm of thin strip of dorsally based flap of extensor retinaculum excised. Wound closed in layers. Sterile dressing applied.

INCISION:

POST OPERATIVE PROTOCOL:

First week:

- After 48 hrs
- Dressing should be clean and dry
- While taking bath patient should apply plastic bags covering the forearm, wrist and hand
- Operated limb should be kept in rest
- Limb elevation
- Avoid thumb movements

- Place that forearm over the chest while sleeping
- Application of ice will reduce the edema and inflammation
- Finger stretching exercise at the end of one week
- Avoid heavy weight lifting
- Encourage small day to day activities like holding the tumbler plate and books.
- Avoid contact of water with the surgical site especially sweat
- If pain is severe oral medications can be used to reduce the edema and inflammation. drugs such as serratiopeptidase, trypsin, chymotrypsin and NSAIDs.
- Patient should apply wrist and thumb splint
- Patient is allowed to wear the splint almost full time

2nd Week:

-at the end of 2nd week, after cleaning the wound with povidone iodine solution, suture removal should be done.

- patient is allowed to take bath over the wound area.

-gentle rubbing over the wound while applying soap.

-allowed to continue the wrist and thumb splint, moderate weight lifting of around 3-4kgs

-patient is allowed to do mild household activities

3rd Week:

-gentle scar massage thrice a day,each episode should last for minimum of 5 mins

-thumb splint hours can be reduced to 3-5 hrs per day

-patient is encouraged to do weightlifting around 5 kgs

-allowed to do cooking and lifting children

-at the end of third week.stretching exercises of the thumb and wrist are allowed.

At around 4-6 weeks,gradual strengthening exercise along with stretching is allowed,if pain is present the strengthening exercise can be done along with NSAIDs.

FOLLOW UP PROTOCOL:

-Weekly interval for initial 2 months

-twice a week for another 2 months

-monthly interval for next 6 months

-then once in 3 months

-all operated cases were followed to a minimum of one to one and a half years.

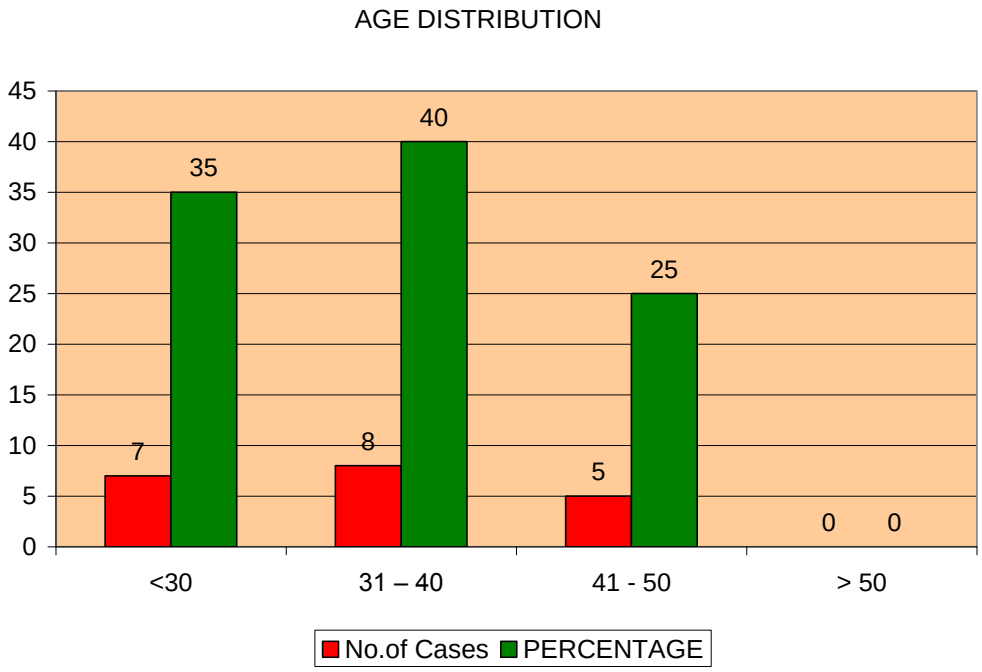
-follow up was evaluated by clinical examination by negative finkelstein test and range of movements of thumb and wrist

STATISTICAL ANALYSIS

DISTRIBUTION OF PATIENTS BASED ON AGE

1.Age Distribution		
AGE	No.of Cases	PERCENTAGE
<30	7	35
31 – 40	8	40
41 - 50	5	25
> 50	0	0
TOTAL	20	

From the above table it is very clear that majority of the cases [40 %] belong to 31 to 40 yrs age group. Average age at presentation is



From the above chart it is very clear that majority of the cases [40 %] belong to 31 to 40 yrs age group. Average age at presentation is

TABLE 2 : DISTRIBUTION OF PATIENTS BASED ON SEX

2.Sex Distribution		
SEX	No.of Cases	PERCENTAGE
MALE	1	5
FEMALE	19	95
TOTAL	20	

From the above table it is very clear that among the patients in this study 95 percent are females and 5 percent are males.

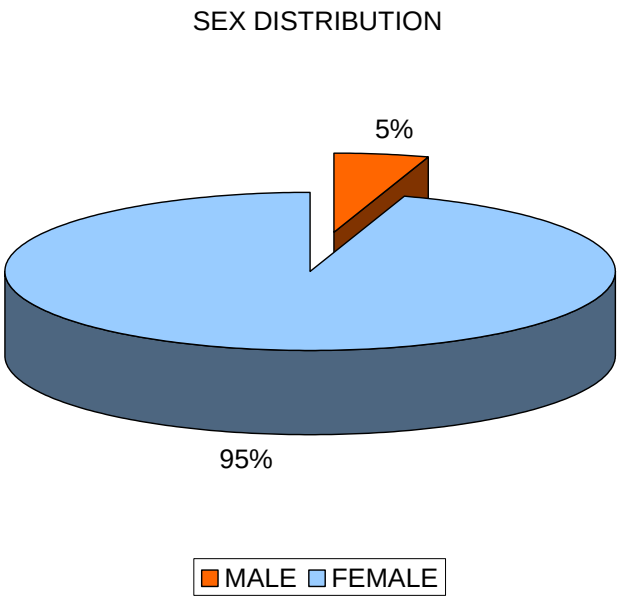


TABLE 3

DISTRIBUTION OF PATIENTS BASED ON THE SIDE AFFECTED

4. SIDE		
SIDE	No.of Cases	PERCENTAGE
LEFT	7	35
RIGHT	13	65
TOTAL	20	100

From the above table it is inferred that in 65 percent of the patients in this study right upper limb is involved.

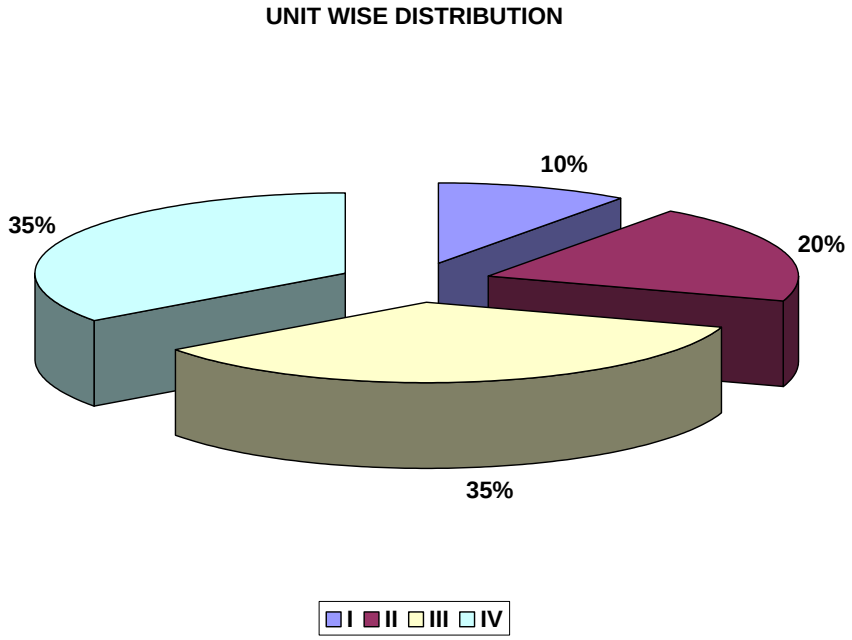


TABLE 5

TABLE SHOWING COMPARISON OF PREOP POST OP DASH SCORE

PRE OP DASH		
PRE OP DASH	No.of Cases	PERCENTAGE
65 - 75	4	20
76 - 85	16	80
TOTAL	20	100

POST OP DASH		
POST OP DASH	No.of Cases	PERCENTAGE
0 TO 5	18	90
6 TO 10	2	10
TOTAL	20	100

	PRE OP DASH to POST OP DASH		
	Mean	STD	P'Value
Pre	78.25	4.149	< 0.001
Post	8.08	1.818	

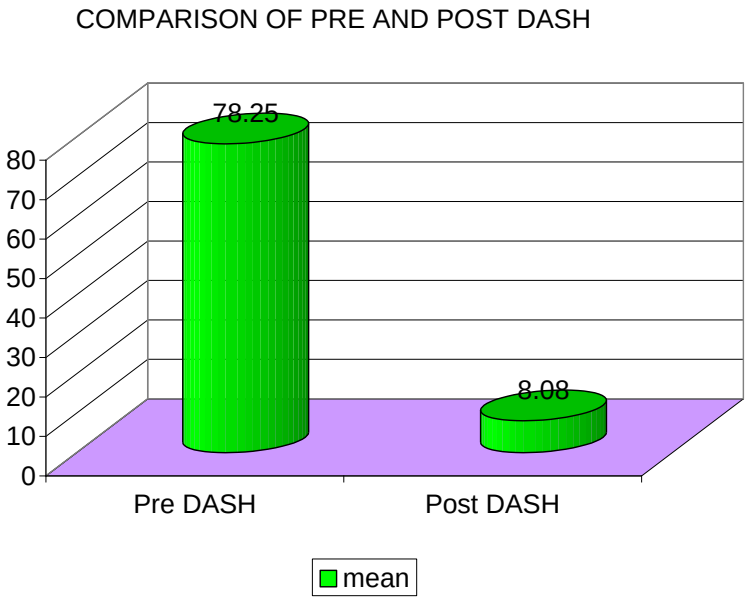
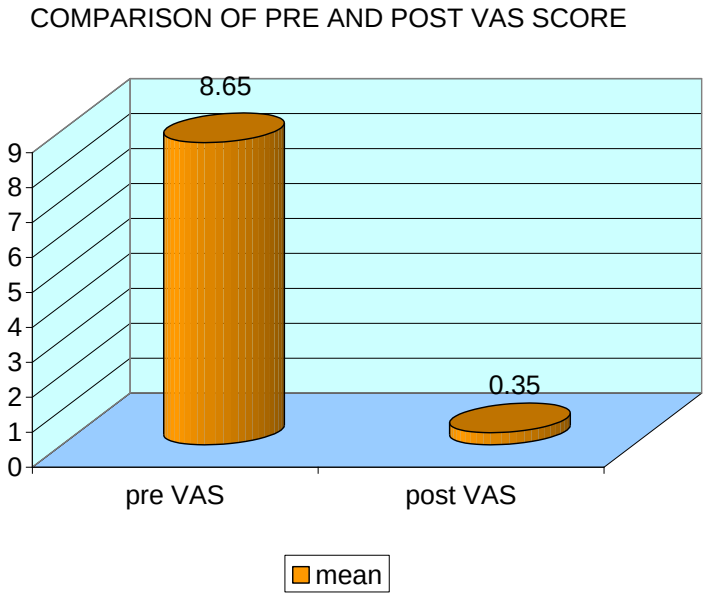


TABLE SHOWING PRE OP POST OP VAS SCORE:

5. PRE VAS		
PRE VAS	No.of Cases	PERCENTAGE
8	7	35
9	13	65
TOTAL	20	100

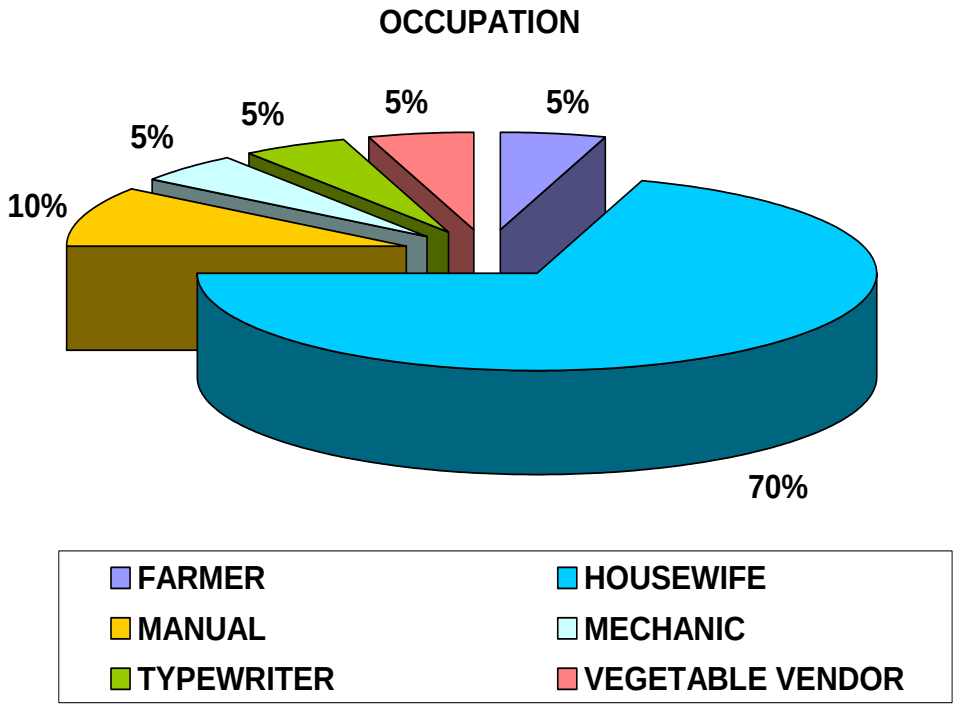
POST VAS	No.of Cases	PERCENTAGE
0	13	65
1	7	35
TOTAL	20	100

	PRE VAS to POST VAS		
	mean	STD	P'Value
pre	8.65	0.49	< 0.001
post	0.35	0.49	



OCCUPATION :

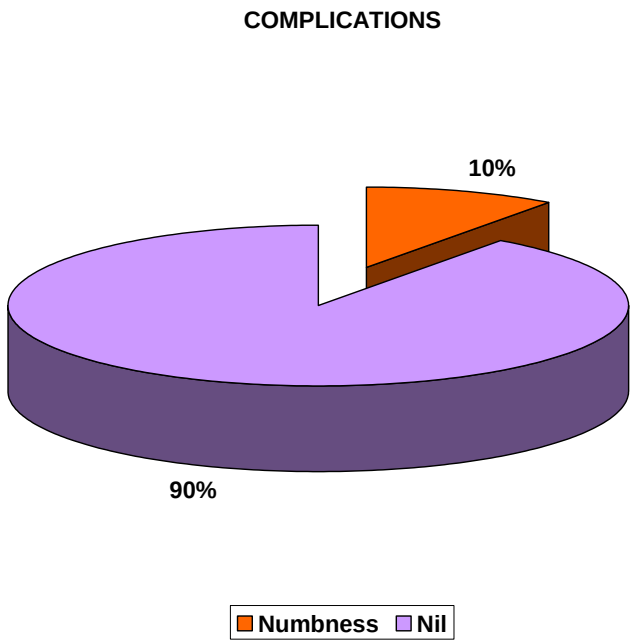
OCCUPATION	No.of Cases	PERCENTAGE
FARMER	1	5
HOUSEWIFE	14	70
MANUAL	2	10
MECHANIC	1	5
TYPEWRITER	1	5
VEGETABLE VENDOR	1	5
TOTAL	20	100


OCCUPATION
5%
5%
5%
5%
10%
70%
FARMER
HOUSEWIFE
MANUAL
MECHANIC
TYPEWRITER
VEGETABLE VENDOR

COMPLICATIONS:

2 patients had numbness over the thumb of the affected limb. Infection rate post operatively was nil in this study

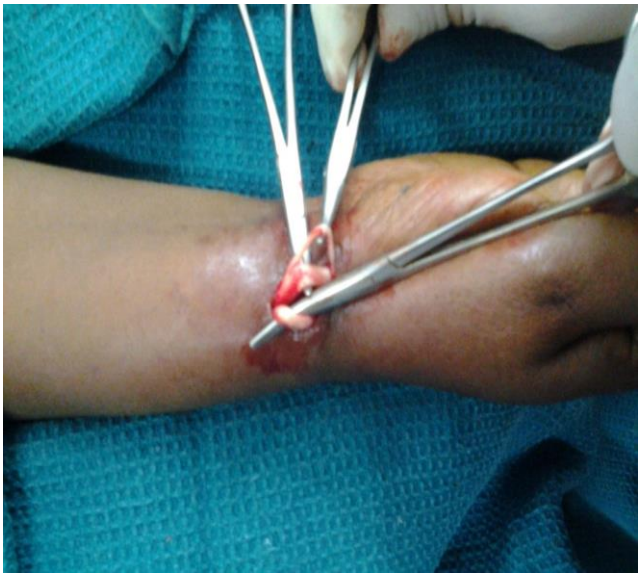
Complication	No.of cases	PERCENTAGE
Numbness	2	10
Nil	18	90



ILLUSTRATIVE CASES: CASE 1

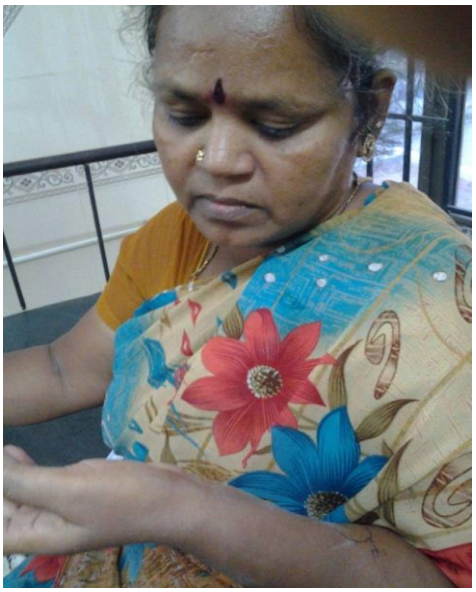
CASE 2:

CASE 3

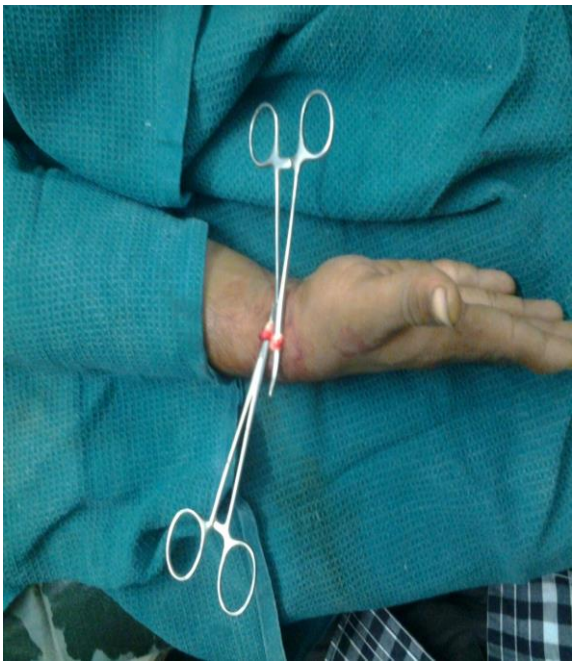


CASE 4

CASE 5



CASE 6

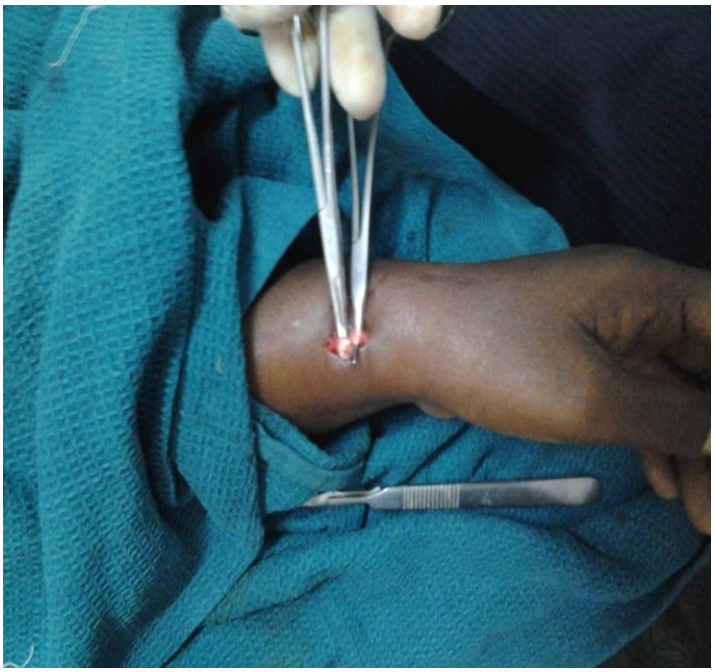


CASE 7

CASE 8

CASE 9

CASE 10



RESULTS

Our study includes 20 resistant cases of de quervains disease. open surgical release of tendon sheath of abductor pollicis longus and extensor pollicis brevis along with excision of thin strip of dorsally based extensor retinaculam. Mean age group in all operated cases 28- 45 years among 20 patients 19 were females 1 is male. Involvement of right wrist is 13 and left wrist is 7. Dominant extremity is commonly involved. Dequervains disease is caused by repetitive forearm wrist activities in our study group housewifes are 75% patients overall. Average time for conservative management is 6 months.

Open surgical release of extensor tendon sheaths of extensor pollicis brevis and abductor pollicis longus. The mean pre operative DASH score is 78.25 where as mean post operative DASH score is 8.03 which is statistically significant. The mean pre operative VAS score is 8.65 where as post operative VAS score is 0.35 which is statistically significant. The successful treatment of dequervains disease is defined as more than a 25% reduction in disabilities of arm shoulder hand (DASH) and visual analog scale without a

reintervention after 1 year. Pain relief was achieved in all 20 patient. 2 cases had transient numbness of thumb . no post operative infection was found.In one of our patients we found an aberrant tendon of abductor pollicis longus which was confirmed by its insertion at the trapezium.The aberrant tendon was identified and released

DISCUSSION

Dequervain's disease is due to chronic repetitive activities which leads to tendon sheath inflammation, fibrosis and stenosis. It causes limitation of the wrist and thumb movement. Pathology shows congestion, edema, inflammation, fibrosis, thickening of the tendon sheath.

Histology shows infiltration and proliferation of the round cells and fibrous tissues of the tendon sheath. Surgical release of tendon sheath of abductor pollicis longus and extensor pollicis brevis along with excision of thin strip of extensor retinaculum which prevents recurrence.

Mellor and Ferris reported 10 complications. One complication (10%) was related to inadequate decompression, six (60%) were related to injury to the superficial branch of the radial nerve, two (20%) were related to wound infections[19] and one (10%) was related to reflex sympathetic dystrophy. Using the longitudinal surgical approach to avoid radial nerve lesions, Bouras et al. noted non-aesthetic scars in three of 20 patients. Harvey et al. reported six complications in 20 wrists treated surgically. Two

complications were related to scars, one was a minor wound infection and three were related to a temporary disturbance of the nerve. There were no neural complications in any of the patients included in our study.

The satisfactory clinical results obtained suggest recommending one-quarter partial removal of the extensor retinaculum on the dorsal side of the wrist in order to prevent problems such as an incomplete release, re-adhesion of the extensor retinaculum and volar subluxation of the tendons after operative treatment of de Quervain's disease. Further prospective, randomized comparative studies with larger populations are needed to confirm these results.

Our study group results are comparable with that of Mellor and Ferris study.

H. J. KANG, I. H. KOH, J. W. JANG, Y. R. CHOI et al study showed the significantly lower rate of nerve injury and greater scar satisfaction in the endoscopic group are consistent with the findings of our previous retrospective study. It should be noted that all radial nerve symptoms resolved with follow-up regardless of the methods

of operation, endoscopic or open release of the first extensor compartment.

Although the previous study reported no radial nerve complications in the endoscopic group, three patients in this study experienced radial nerve symptoms after surgery. the findings and results in 52 cases of deQuervain's disease.

Of this number, 24 were carried out by staff members of St. Elizabeth's Hospital, Brighton, Massachusetts, and six by staff members of the Camey Hospital, South Boston, Massachusetts.

It is apparent that the disease is more prone to occur in women. Of the 52 patients undergoing surgery, there were 39 females as opposed to 13 males, or a ratio of 3 to 1. The average age was 41.5 years, with a maximum of 64 and a minimum of 17.

It is difficult to designate this disease an occupational disease, but in this group of 52 cases, "the vast majority were individuals accustomed to work with their hands."

It is obvious that the duration of symptoms prior to surgery is extremely long, with a maximum of nine years and one month, and an average of eight months.

The results were almost uniformly excellent, and all the patients claimed immediate relief of discomfort on the day after operation. There was one case listed as "no improvement," which can be attributed possibly to a co-existent severe arthritic condition of the wrist.

All resistant cases of dequervain’s are subjected to surgical line of management. Surgery can be either open or endoscopic release of tendon sheath of abductor pollicis longus and extensor pollicis brevis along with excision of thin strip of extensor retinaculum.

Recently published long term follow up studies of both arthroscopic and open methods of surgical release have demonstrated similar outcome. It appears that either surgical technique is acceptable as long as the pathological tissue is accurately identified and adequately resected, although there are

advantages and disadvantages to each procedure, no technique appears superior to others.

Based on our observation short term follow up shows excellent outcome, longer term follow up evaluation are required to substantiate our results. In or study tendon sheath release along with removal of thin strip of extensor retinaculum gives encouraging results of an alternative treatment that addresses the pathophysiology of dequervain’s disease that has failed traditional nonsurgical modalities.

LIMITATIONS

Our study is limited by less number of patients and being a non randomized study

- our sample size is small-
- mean follow up period is small
- surgery is done by different surgeons and the observer is not blinded

CONCLUSION

Release of abductor pollicis longus and extensor pollicis brevis tendon sheath alongwith thin strip of dorsally based flap of retinaculam removal will improve the functional outcome.

1. DeQuervain's Disease, although frequently unrecognized, is a crippling condition which is easily remedied by surgery.

2. There has been demonstrated a technic which is simple to follow and avoids injury of the cutaneous branch of the radial nerve.

3. The condition is far more prone to occur in women, and this pathologic condition should be considered in the differential diagnosis of persistent pain at the base of the thumb in the region of the radial styloid.

4. Surgery is the only treatment for this condition, and should be carried out as soon as possible. In our study group follow up is short term. Long term follow up is necessary before conclude the outcome.

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ANNEXURE- I

DASH Score

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar	1	2	3	4	5
2. Do heavy household chores (e.g., wash walls, wash floors)	1	2	3	4	5
3. Carry a shopping bag or briefcase	1	2	3	4	5
4. Wash your back	1	2	3	4	5
5. Use a knife to cut food	1	2	3	4	5
6. Recreational activities in which you take some force or impact through your arm, shoulder, or hand (e.g., golf, hammering, tennis, etc.)	1	2	3	4	5

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
7. During the past week, *to what extent* has your arm, shoulder, or hand problem interfered with your normal social activities with family, friends, neighbors, or groups?	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder, or hand problem?	1	2	3	4	5

Please rate the severity of the following symptoms in the last week. (circle one)

	NONE	MILD	MODERATE	SEVERE	EXTREME
9. Arm, shoulder, or hand pain.	1	2	3	4	5
10. Tingling (pins and needles) in your arm, shoulder, or hand	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
11. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand?	1	2	3	4	5

Quick DASH DISABILITY/SYMPTOM SCORE: [(sum of n responses/ n) -1] x 25, where n is equal to the number of completed responses.

A Quick DASH score may not be calculated if there is greater than 1 missing item.

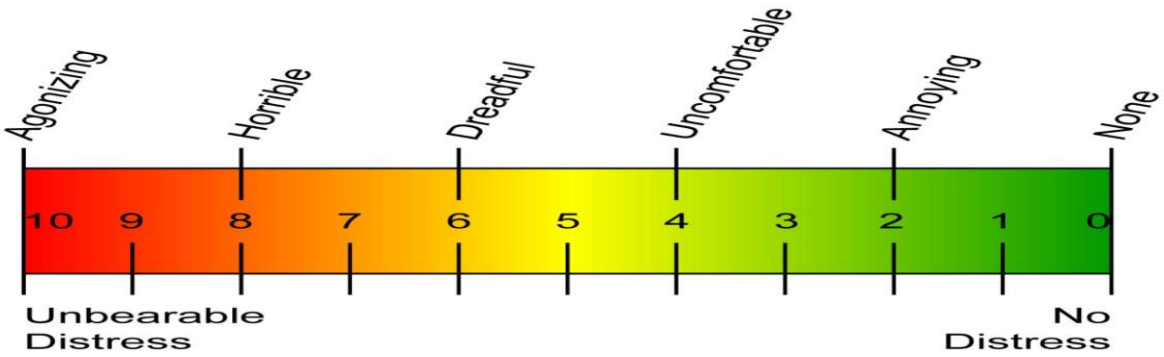
Form #: FS0345
Adopted: 4/06
Reviewed:
Revised: 9/07, 12/07, 10/08, 3/09

DASH Score: ____ %

rhbs

ANNEXURE- II

VISUAL ANALOG PAIN SCALE



Task _____

Date _____ *Start* _____ *End* _____

ANNEXURE-III

PROFORMA

PATIENT DETAILS

NAME		UNIT	
AGE		IP NO:	
SEX		DATE OF ADMN	
DATE OF SURGERY		DATE OF DIS	
Side			
ADDRESS			
OCCUPATION			
CONTACT NUMBER			
FOLLOW-UP	**6 WEEKS**	**6 MONTHS**	**1 YEAR**
VAS			
DASH Score			
Complications			

MASTER CHART

SL NO	IP NO	AGE	SEX	UNIT	SIDE	PRE VAS	OP DASH	POST VAS	OP DASH	OCCUPATION	COMPICATIONS
1	231/13	30	F	III	RT	8	79.5	0	6.8	HOUSEWIFE	
2	212/13	29	F	IV	RT	9	81.5	0	7.2	VEGETABLE VENDOR	
3	256/13	35	F	III	LT	8	75.2	1	9.8	HOUSEWIFE	
4	45583	27	F	I	RT	9	78.0	0	7.0	HOUSEWIFE	
5	59882	38	F	II	RT	8	76.5	0	6.3	HOUSEWIFE	
6	43008	24	F	IV	LT	9	80.6	0	6.0	HOUSEWIFE	
7	46711	26	F	III	LT	8	69.8	0	6.3	HOUSEWIFE	
8	51008	50	F	II	RT	9	72.1	1	9.7	HOUSEWIFE	
9	49007	35	F	I	RT	9	71.7	0	7.0	TYPEWRITER	
10	50004	47	F	III	LT	8	70.9	0	6.2	HOUSEWIFE	
11	50877	26	F	IV	RT	9	82.3	0	7.3	HOUSEWIFE	
12	51337	43	F	III	RT	9	80.0	1	8.3	FARMER	
13	51888	32	F	III	LT	8	79.4	0	8.8	MANUAL	
14	52007	44	F	IV	RT	9	81.9	0	6.2	HOUSEWIFE	
15	49002	29	M	IV	RT	9	82.5	0	7.3	MECHANIC	
16	48003	35	F	II	LT	8	79.0	1	10.7	HOUSEWIFE	NUMBNESS LT THUMB
17	49555	36	F	III	RT	9	80.6	1	9.9	HOUSEWIFE	
18	44270	37	F	IV	RT	9	82.5	0	8.6	HOUSEWIFE	
19	50214	36	F	II	LT	9	78.9	1	9.8	MANUAL	
20	54300	50	F	IV	RT	9	82.0	1	12.5	HOUSEWIFE	NUMBNESS RT THUMB